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Preparedness of First Responders in Gwinnett County, Georgia: Barriers to Preparedness and the Impact of Cognitive Biases

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PREPAREDNESS OF FIRST RESPONDERS IN GWINNETT COUNTY, GEORGIA: BARRIERS TO PREPAREDNESS AND THE IMPACT OF COGNITIVE BIASES

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By:

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ABSTRACT

While it is important for the public to be prepared for emergencies and disasters, it is perhaps more important for first responders, as members of the public, to be prepared for emergencies and disasters, so they may do the job the public expects of them. This study explores the preparedness of first responders in a large, diverse, and heavily populated metro-Atlanta county. It also investigates impediments to these first responders being better prepared and the role cognitive biases play in preparedness for this group. The study finds that the study population, as a whole, is underprepared. The research also reveals certain impediments and cognitive biases that show a correlation to preparedness levels in the study population. These findings suggest steps organizational leaders and policymakers can take to enhance preparedness levels among this group of first responders by removing impediments and mitigating cognitive biases.

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VITA

Jeffery Lee Smith was born in Summerville, Chattooga County, Georgia, and was raised in Gwinnett County, Georgia by his parents, Luther C. and Alayne (Jones) Smith. He is married to accomplished author and newspaper columnist, Katie (Hart) Smith. Mr. Smith began a career in law enforcement in 1988, serving in numerous capacities. He earned an Associate of Arts in Mathematics from Perimeter College (now Georgia State University), a Bachelor of Science in Business Administration from Shorter College (now Shorter University), and a Master of Public Administration in Justice Administration from Columbus State University. The Smiths reside in Lawrenceville, Gwinnett County, Georgia.

DEDICATION

To my best friend who helped guide me from darkness to light,

who taught me how to love with all of my soul,

and who is my biggest encouragement and inspiration.

My greatest accomplishments have all been with you at my side.

Katie Hart Smith, you are my world.

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We cannot choose our external circumstances,

But we can always choose how we respond to them.

- Epictetus

Chapter 1

Introduction

All emergencies, disasters, and catastrophes are local events. This is not to state that they do not spill past artificially-created local jurisdictional boundaries, or that the scope and extent is not much greater than local communities. Kapucu, Hawkins, and Rivera (2013) succinctly state a known axiom of emergency management, "disasters are not confined to one particular jurisdiction" (p. 218); however, at the micro level, a local community is impacted regardless of the wider effect on multiple jurisdictions. The present study is interested in the local and personal frames of reference.

Within local communities is a subset of the population that is expected to be present and active in the face of an emergency – first responders. Traditionally, local first responders include law enforcement, fire services, and emergency medical services. First responders, being a subset of the overall population, are subject to the same forces and impacts that victimize the local population. Therefore, first responders too are subject to victimization (i.e. the detrimental impact of an event on the individual), which may impact their ability to respond to an event in an expected manner. One manner to potentially mitigate personal victimization is preparedness.

Preparedness is one of the four interwoven stages of an emergency management cycle. Researchers and professionals have identified the need for preparedness and the importance preparedness plays in being resilient in the face of an emergency. While the literature is replete with studies and research of individual, group, organizational, and community preparedness, a gap is readily apparent.

Individual Preparedness Among First Responders

Much of the extant literature on the topic of individual preparedness seems to accept a response by first response actors and agencies without question. The aftermath of Hurricane Katrina brought an issue into stark focus – first response agencies and personnel are not immune to the effects of a disaster (Trainor & Barsky, 2011). Like their non-response community counterparts, first response personnel are subject to all of the effects and calamity that follow a disastrous event. Therefore, the personal preparedness of first response personnel should be of paramount concern for an effective response capability.

In an event, first response personnel may have their normal call to action dampened by events in their own life. First responders forced to make a decision between assisting family and performing the duty to the larger community will likely eschew the community duty in favor of a greater sense of duty to the closer family unit (Kelenske, 2011). This role conflict may be mitigated with proper planning and preparedness (Kelenske, 2011). Individuals must take responsibility for their personal preparedness for emergency situations, especially those who have taken on the mantle of first responders.

Tierney, Lindell, and Perry (2001) discuss the dearth of research on "crisis-relevant" organizations once the focus moves from the central and overarching emergency management structure to the first response organizations of law enforcement, fire services, and emergency medical services (p. 63). They, like Wenger, Quarantelli, and Dynes (1989), find only two studies involving police outside of research conducted by the Disaster Research Center and research concerning issues of civil unrest.

That the preparedness of first responders has not received attention in the research is troubling. Tierney et al. (2001) state, "almost nothing new has been learned about police and fire

department disaster preparedness." Tierney et al. (2001), like Wenger et al. (1989), focus specifically on the organization, not the individuals that make up such organizations. Similarly, while much research has been conducted on personal preparedness in the general population, when the focus narrows to the subset of first responders the amount of available research drops dramatically.

Failure to Prepare

Much of the research to date shows remarkably low levels of individual preparedness in the general population. Why do people fail to prepare when they overwhelmingly agree that it is a good idea? The current study will look at barriers and motivators to preparedness, as have been studied by the Federal Emergency Management Agency [FEMA] in their preparedness studies of the general population (2014). In addition to barriers such as time, money, and information, cognitive biases as barriers will be explored.

Meyer and Kunreuther (2017) have filtered through years of decision theory and cognitive bias research and built on the previous work of Kahneman (2011) to arrive at list of six cognitive biases they believe stand in the way of preparedness on many occasions by impacting the way in which individuals perceive risk. The biases identified by Meyer and Kunreuther are:

1. *Myopia: a tendency to focus on overly short future time horizons when appraising immediate costs and the potential benefits of protective investments;*
2. *Amnesia: a tendency to forget too quickly the lessons of past disasters;*
3. *Optimism: a tendency to underestimate the likelihood that losses will occur from future hazards;*

4. *Inertia: a tendency to maintain the status quo or adopt a default option when there is uncertainty about the potential benefits of investing in alternative protective measures;*
5. *Simplification: a tendency to selectively attend to only a subset of the relevant factors to consider when making choices involving risk; and*
6. *Herding: a tendency to base choices on the observed actions of others.* (p. 12)

These biases forwarded by Meyer and Kunreuther should apply across the population, even subsets of the population such as first responders.

This study seeks to identify if the first responders are prepared, and if not, what barriers and impediments exist that help explain failures to prepare. Barriers and biases that are impediments to preparedness must be identified before they may be mitigated or defeated. It is hoped this research will identify specific barriers and biases to allow for strategic efforts to combat the impediments with a goal to increase preparedness among first responders.

Research Questions

Recognizing the importance of individual preparedness among first responders, and wanting to find why first responders who do not prepare have made the choice not to prepare, the following research questions were formed:

Q1: How prepared are first responders, individually, for emergencies or disasters?

Studies regarding individual preparedness in the general population (e.g. FEMA, Red Cross) have been popular for many years. In addition, research regarding preparedness among first response organizations has also been conducted. However, studies that capture preparedness among individuals within first response organizations are relatively few.

In a larger sense, the individual preparedness of first responders should be of paramount concern to all sectors of the emergency management community. The ability to effectively and efficiently respond to crisis events is an expectation the public places on local, state, and federal governments. The implications of ill-prepared first responders could have problematic ripple effects that could exacerbate an emergency, for if the first response systems fail or underperform, there could be downstream effects. Such a failure could negatively impact the resilience of a community.

Q2: What impediments to individual preparedness do first responders identify as impeding their personal efforts toward preparedness?

In order to better facilitate individual preparedness levels among first response personnel, it is important to identify impediments to such preparedness. A logical first step in identifying such impediments is to explore self-reported impediments. It is important to note that impediments may be based in ignorance (lack of knowledge on preparedness), based in personal finances (lack of assets needed to properly prepare), or based on a cognitive bias. Identification of impediments will allow for discussion of the impediments and development of strategies to mitigate such impediments.

Q3: Which cognitive biases are self-identified by first responders as impediments to personal preparedness? Once identified, is any one bias more influential than others?

Using the data gathered from first response personnel, are cognitive biases, especially as discussed by Meyer and Kunreuther (2017), evident? Are they prevalent? Which of the cognitive biases are most prevalent among first response personnel?

Preparedness Index

Rather than a binary or dichotomous view of preparedness (prepared or not prepared), a preparedness index or scale based on the work of Kapucu (2008) is used to measure levels of preparedness. Use of an index to measure preparedness will allow for an exploration of what factors may correlate with higher levels of preparedness and which factors show potential impediment to preparedness.

The index will allow for the conventional exploration of demographic variables (e.g., gender, age) as they correlate with preparedness.

Study Population

This study will explore individual preparedness levels among first response personnel in a large county in Georgia. The exploration is two-fold: first, it aims to determine what individual preparedness efforts have been taken by first response personnel, if any; secondly, the study will explore impediments and reasons for any lack of preparedness found. Impediments to preparedness will be investigated to understand the role of cognitive biases in any perceived failures to prepare.

The study will be based on surveys of first response personnel in a large metropolitan county. Police, fire, and emergency medical personnel will be included in the study. Surveys will be introduced to the target population personally.

Organization of Document

The research is described and documented in this document. The first chapter consists of an introduction to the problem and the research questions being asked. The second chapter will review extant literature on preparedness, first responders, barriers and impediments to

preparedness, and cognitive biases as barriers to preparedness. Relevant methodological literature will be reviewed as well.

The third chapter will discuss methods being used in the study to collect data in order to better explore and answer the research questions posed. The third chapter will also discuss the survey instrument being used to collect data, and the methods used to present the survey to research participants. The selected study population is discussed in detail in chapter 3.

The fourth chapter will discuss the data collected and the analysis of the data in a manner best suited to provide answers to the research questions. The fifth and final chapter will discuss the findings, the implications thereof, and the potential ramification of the research findings. The fifth chapter will also discuss limitations found in the present research and propose suggestions for future research on the topic(s) presented.

Summary

First responders play an important role in emergency and disaster response. In order to be most effective, individuals who work in first response roles should be prepared, perhaps to a greater extent than the general public, as the general public counts on those first responders in times of crisis.

This study explores the preparedness of first responders in one large metropolitan southern county in order to gauge how prepared they are. Additionally, the study will attempt to identify impediments to the individual preparedness of the first responders. The impediments will be viewed in light of cognitive biases, especially those identified by Meyer and Kunreuther (2017) as being particularly related to impeding preparedness.

Chapter 2

Literature Review

In order to inform the present research, a review of extant literature focusing on preparedness is necessary. In order to be salient, it is important to focus the review of literature on individual preparedness as opposed to organizational, group, or community preparedness. The review will further focus on preparedness amongst first responders and manners best devised to measure preparedness.

The review will then pivot to examine impediments to preparedness or risk perception. Commonly identified impediments will be discussed for inclusion in the present study. Cognitive biases as impediments to risk perception will also be explored for inclusion in the present study.

Individual Preparedness

There has been much written concerning preparedness. In order to better define the scope of the literature to be reviewed, it is important to restate that the present study is focused on the preparedness of first responders as individuals. While much has been written on the topic of preparedness, it is noted that organizational preparedness, for example, would not be germane to the present study. In order to find the most relevant information, the literature is filtered to review the idea of preparedness amongst individuals. Individual preparedness is the level of preparedness at the most granular level – the singular individual or household. This review is not purporting to be an exhaustive review of the extant volumes of preparedness literature. Rather, it is intended to show commonality across the literature that lack of individual preparedness is an issue. Furthermore, and perhaps more importantly, no studies have been

found that would contradict this position. This allows the present study to begin with an assumption that preparedness is lacking in the general population (Gerber, 2007).

Preparedness in the General Public

Preparedness at the individual level is vital to resilience (Kapucu, Hawkins, & Rivera, 2013). This idea seems plain enough to merit action on the part of the public; however, despite recent disasters, the American public has not been moved to become better prepared (Kapucu, 2008; Perez-Fuentes & Joffe, 2015; see also Hsu, 2005, and Waugh, 2006). In fact, individual preparedness has consistently been found to be inadequate to meet potential needs (Kapucu, 2008; King, 2000). Gerber (2007), boldly states, "because instances of deficiencies in planning …at an individual level have been widely documented by disaster research scholars and by professional analyses, the claim can be considered axiomatic" (p. 229). The importance of preparedness at the granular individual level is important to the entire premise of disaster preparedness. As Waugh (2003) informs, emergency management networks are defined by their bottom-up capacity, not top-down. If leaders are all prepared, but the citizens are not, the system will have problems.

FEMA (2014) indicates four categories for gauging preparedness in their study and on their readiness website (ready.gov):

- Be informed;
- Make a plan;
- Build a kit; and
- Get involved

The August, 2014, update of the FEMA study Preparedness in America shows no increase in individual preparedness from their previous studies. Unfortunately, the study showed

a decline in the number of persons who have an emergency plan that they have discussed with others in the household. The numbers declined from 42% in 2011 to 39% in 2012. While 52% of those surveyed in the FEMA study indicated they had emergency supplies, only 29% reported that they updated their supplies and could name at least three of the supplies kept. Only 34% of those surveyed in the FEMA study had changed preparedness behavior and maintained such greater than six months. Shockingly, 21% indicated no change or inclination to think about changing in the near future. The majority of participants believed that preparedness would help the situation across all hazards except a terrorist act; however 47% believed it would help in the event of a terrorist attack.

In 2004, Wirthlin Worldwide conducted a study for the American Red Cross, and found only 11% of the 1,001 participants had been certified in CPR or first aid, assembled an emergency kit to include a three-day supply of food and water, and created a family emergency plan. Each of these three categories had higher response rates individually: first aid/CPR – 47%; emergency kit – 42%; family emergency plan – 32%. These numbers show an incongruity between knowledge and action, as 96% of those surveyed found it important to take steps to prepare. Demographics also were significant. Those with lower levels of education and those with lower annual household incomes rated the need to prepare higher than those with higher education and those with higher household incomes. Black and Hispanic respondents also had higher percentages than whites in ranking the need to prepare as very important. Overall, the study found 80% responded that their family was either somewhat or very prepared while 20% indicated they were not too prepared or not prepared at all. Those who ranked most prepared in the study were found to have:

- a disaster kit (40%);

- a family emergency plan (39%);
- taken personal initiative to find information on preparedness (33%); and,
- first aid or CPR training (27%).

In 2005, Peter D. Hart Research and Public Opinion Strategies [Hart Research] conducted research for the American Red Cross and the Council for Excellence in Government. The research concluded that the American response in terms of increased individual preparedness in the wake of events such as Hurricanes Katrina and Rita and the terrorist attacks of September 11, 2001, was "nearly nonexistent" (p. 1). The study found a majority of people believed a disaster would never happen to them (54%), and the researchers concluded that, "people remain unmotivated to actively prepare for a disaster near *their* home affecting *their* family" (p. 2, emphasis in original). The study stopped short of calling the American public unprepared; however, it did conclude that they are ill-prepared. Like the Wirthlin Worldwide (2004) study, Hart Research (2005) found persons in lower income brackets were more likely to be prepared than their upper-income counterparts; however, unlike the Wirthlin Worldwide study, Hart Research found a similar lack of preparedness across ethnic groups. The key findings in the Hart Research include findings that few Americans (43%) have a disaster kit, and even fewer families have communications plans (36%) or established meeting places (25%).

Although first responders are members of the general public, and certainly a small subset of the greater population, they play a critical role in emergency and disaster response. The public looks to first responders to be ready to assist when a disaster strikes. If they are expected to respond, they should first be prepared for a disaster, so that the impact to first responders, on a personal level, is mitigated such that they are able to respond effectively.

Expectations of First Response Personnel

Protecting the public from harm is a fundamental purpose of government (Comfort, 2005). The importance of researching the preparedness of first responders is seen in the literature (Adams, 2014). While first responder preparedness has been researched, much of the extant literature focuses on organizational preparedness rather than individual preparedness (e.g., Cooks, 2015; Roberts, Roberts, Jr., & Liedka, 2012). According to Kapucu (2008), "Real disaster preparedness for individual citizens means being ready to help your family, friends, and neighbors when a disaster or an emergency strikes" (p. 526). This definition seems to encompass what would be expected of first response personnel, however, the limited literature contemplating preparedness of these critical resources could be an indication that preparedness among first responders may simply be taken for granted by many. Kelenske (2011) describes the capability of first response personnel as critical to disaster response; however, Kelenske also describes the public's assumption that first responders will be ready. Discussion regarding first response personnel not being available during a disaster was nearly non-existent prior to Katrina. While "current accurate information" on individual preparedness is absolutely needed, (Kapucu, 2008, p. 526), the stakes are even higher for first response personnel, as inadequacies in preparedness could have detrimental effects on the larger community they serve (Gerber, 2007; Kelesnke, 2011). This problem could be magnified in rural areas. In areas outside of urban centers, local officials often face more demands, as resources and coordination between jurisdictions may be severely limited (Kapucu, et al., 2013).

Often overlooked is the fact that first responders are often impacted by the very disaster to which they are responding. Frailing and Harper (2012) discuss the needs of first response personnel to be effective if the event hits home. If first responders become victims, there is a

strong intersection with Abraham Maslow's Hierarchy of Needs theory (1943), in which responders, as humans and members of the community, will seek to meet their most basic needs before heeding a call to duty. Frailing and Harper (2012) discuss needs such as undamaged housing and provisions for extended work in an area with damaged or destroyed infrastructure. This seems to be in keeping with Maslow's Hierarchy of Needs theory, which would apply to first response personnel as it would to the general population. Frailing and Harper (2012) also discuss the need for mental health counseling during the response; however, the most important discussion centers on planning, preparing, and training personnel so they will be available.

The general public expects much from those who have chosen a first response career. The public should be able to count on those who have taken on the mantle of service to the larger community. There is a responsibility placed on those who serve their communities, and they should be prepared to serve when called.

Preparedness Amongst First Responders

Communities expect first responders to respond. A full and meaningful response may be predicated by proper preparedness on the part of first response organizations and individuals. However, our first responders may not be adequately prepared. A 2004 survey of executive fire officers found that only approximately one-third of fire departments had prepared their personnel for multi-day responses. 48% of the respondents indicated multi-day events would cause problems within a family. In a 2007 study of firefighters, it was learned that preparedness and the safety of family would be major concerns in the ability of the firefighters to respond in an incident, and these issues would impact response (FEMA, n.d.). Similar findings were found in a 2007 study of Medical Reserve Corps personnel (FEMA, n.d.). Despite the strong indications of the need for preparedness in the studies discussed, the 2004 study showed only 40% of the first

responders indicated a family preparedness plan was in place (FEMA, n.d.). Worse yet, in a 2009 study of police and fire personnel, only 18% had a preparedness plan for their self or family (FEMA, n.d.). While recent research tends to show first response personnel may not be adequately prepared, "there is a lack of information and data indicating *why* first responders and their families are not adequately prepared" (Kelenske, 2011, p. 4, emphasis added).

In a 2005 Center for Homeland Defense and Security survey of police officers, the vast majority of participants (73-91%) believed their departments and/or cities were not prepared (FEMA, n.d.). If the government is ill-prepared, and a department of that government is ill-prepared, it is expected the constituent employees of the department will also be ill-prepared, as a culture of preparedness has not been instituted or emphasized. A separate 2006 study of police officers revealed lack of family plans, lack of departmental preparedness, and a lack of preparedness information disseminated by the department (FEMA, n.d.). While the responsibility for individual preparedness lies with the individual, the first response organization should take an active role in training and encouraging preparedness among its first-response employees. A 2008 study showed almost all of the respondents (98.8%) believe employers had a role in encouraging and training employees in preparedness efforts for the employees and their families (FEMA, n.d.). A 2009 study showed similar results; 96% of those surveyed indicated they would participate in planning and preparedness if offered by the department (FEMA, n.d.).

Preparedness for first responders does not differ much from preparedness for the general public. A special campaign targeting first responders – the Ready Responder program – was developed by the United States Department of Homeland Security's Office of Infrastructure Protection, the National Protection and Preparedness Directorate, and the Federal Emergency Management Agency [FEMA]. While the recommended plans and emergency kit items are very

similar to those recommended for the general public, the reasons for preparedness amongst this subset of the population are potentially more important. A failure to prepare by first response personnel could have detrimental effects on response efforts. The Ready Responder program states, "By ensuring that their families are safe and protected, responders can turn their full attention to the life-saving missions of the rest of the community" (FEMA, n.d., p. 1).

It is established that the general public should be better prepared for disasters, and that the reliance on first response personnel makes the preparedness of first responders very important. To gauge the preparedness of first responders as individuals, a method for measuring preparedness and defining what it is to be prepared must be formulated.

Defining and Measuring Preparedness

After identifying a need for preparedness, methods of measuring or quantifying such preparedness should be identified. As mentioned earlier, FEMA (2014) indicates four categories for gauging preparedness in their study and on their readiness website (ready.gov):

- Be informed;
- Make a plan;
- Build a kit; and,
- Get involved

It can certainly be argued that first responders all meet the final bullet point, as they are by definition and career very involved in the emergency management cycle. FEMA's first responder-targeted Ready Responder program emphasizes an emergency supply kit, family emergency plans, and being informed on the types of emergencies faced and what to do when it occurs. For this reason, the current study will focus chiefly on information, emergency supplies, and emergency plans.

Kapucu (2008) considered American Red Cross steps that accounted for "personal, household, and community needs in a disaster" (p. 530), which include: having and exercising an emergency plan, possession of adequate disaster supplies, training for emergencies, volunteering in the community, and donating blood. As was discussed with the FEMA categories, the present study will focus principally on plans and supplies or kits.

Kapucu (2008) provided a method for quantifying the dependent variable of emergency preparedness by combining questions to form an index variable. An important step was the eschewing of questions that measure some level of agreement or disagreement with a statement in favor of questions with dichotomous answers that have "definite objective measures" (p. 530). By combining answers to several questions, Kapucu arrives at an "index of preparedness" that included "yes" responses for the following statements:

- My household has an evacuation plan in case of a hurricane.
- My household has an evacuation plan in case of a fire.
- My household has a disaster supply kit.
- My home has emergency insurance.
- At least one person in my household is currently trained in first aid and CPR.
- At least one member of my household currently volunteers at a community organization.
- My household has an identified emergency contact. (pp. 530-531)

Other similar statements were removed, as Kapucu believed their inclusion could artificially increase differences between prepared and unprepared individuals. The items used in the construct of the index may not be generally applicable. For example, persons in Kansas (far removed from any coast) would not necessarily be expected to have a hurricane evacuation plan. Additionally, the inclusion of first aid and CPR training could increase preparedness indices for

first response personnel who commonly receive this training as part of their job. This is not to say the construct is erroneous, as first response personnel, due to their careers, are expected to have higher scores in first aid and CPR training.

Creation of a preparedness inventory taken from the previously-discussed literature and common published preparedness or readiness guides (e.g. American Red Cross, 2009; FEMA's ready.gov website) will allow for a gauge of individual preparedness. Using an amalgam of suggested resources from preparedness-related agencies, an index may be constructed using the methods described by Kapucu (2008). The most targeted information available that addresses the preparedness of first responders comes from the Federal Emergency Management Agency's Ready Responder program and informational/educational literature.

Key emergency supply kit items from the FEMA Ready Responder publications to include in a preparedness index construct for first responders are:

- One gallon of water per person per day for a minimum of three days (can be re-written as at least three gallons of water per person);
- Three-day supply of non-perishable food;
- Manual can opener and utensils for eating;
- Battery-powered or crank radio with extra batteries (if applicable);
- NOAA weather radio with tone alert with extra batteries (if applicable);
- Flashlight and extra batteries;
- First aid kit;
- Whistle to signal for help;
- Particulate mask, plastic sheeting, and duct tape;
- Moist towelettes, garbage bags, and plastic ties;

- Wrench or pliers to turn off utilities;
- Maps;
- Important family documents; and,
- Phones and/or two-way radios. (FEMA, n.d., p. 10)

Suggested emergency plan contents that should be included in a preparedness index include the following:

- Meeting location in neighborhood;
- Alternate meeting location;
- Out-of-town contact; and,
- Gathering of essential information. (FEMA, n.d., p. 11)

How these items are put together in an index to measure preparedness levels amongst first responders in the study will be covered in Chapter 3. In addition to measuring actual preparedness, the study will look at certain demographics that have been included in past studies as predictors or correlates with preparedness.

Measuring variables that define preparedness can be difficult. While direct observation would be the most objective manner of measurement, it is not always a viable, effective, or efficient option. Self-reporting surveys can be informative despite some limitations.

Use of Self-Reporting Surveys

The use of self-reported data is viewed by some social scientists as having limitations that could call use of such data into question. Chan (2009) discusses the long history of these assumed limitations (e.g. Campbell & Fiske, 1959; Couch & Keniston, 1960; Cronbach, 1946; Nisbett & Wilson, 1977). These limitations, which could include participant biases such as recall bias and social desirability bias, or construct validity issues caused by common method

variance, have been discussed across many disciplines (see examples in medicine (Kuczmarski, Kuczmarski, & Najjar, 2001), sport and exercise science (Sallis & Saelens, 2000), psychology (Harrison, 1997), crime victimization (Cantor & Lynch, 2000), nursing (van de Mortel, 2008), and ethics (Randall & Fernandes, 1991)). However, while self-reported data is widely seen as having definite limitations, other researchers have discounted the purported shortcomings. Chan (2009), for example, has challenged those who would see self-reported data as automatically limited.

The present study is not suited for direct researcher observation or ratings from supervisors or peers, who could not be expected to have direct knowledge of the data needed. Accordingly, the present study will make use of a self-reporting instrument and the limitations that may accompany such use. It will be important to remain cognizant of the potential limitations as data is collected, and the limitations, real or not, will be discussed in Chapter 5.

The survey instrument used will explore preparedness and hopefully provide data to show its correlation to several variables that either predict or impact preparedness. The research is especially interested in what issues may create barriers or impediments to preparedness.

Variables that Predict Preparedness

Various demographic and other variables have been included in studies to assist researchers and practitioners understand who is prepared and perhaps why they are prepared. Typical demographics such as gender, age, level of education, income level, and race or ethnicity have all been included in several studies. Other variables that commonly appear in the literature include disaster experience, perception of risk, and exposure to specific information or training. While these variables are seen in many studies, the impact of any particular variable on the level

of preparedness is not exactly clear. Many variables show mixed results within the preparedness literature.

Many studies on individual preparedness have examined gender as a predictor of preparedness. Despite gender being investigated on multiple occasions and on multiple continents, the results are somewhat mixed. While the majority of studies reviewed showed males more likely to take preparedness actions (for example: Borque, Miletti, Kano, & Wood, 2012; Borque, Regan, Kelley, Wood, Kano, & Miletti, 2012; Miceli, Sotgiu, & Settanni, 2008; Pampel, 2012; Paul & Routray, 2011; Sattler, Kaiser, & Hittner, 2000), not all studies agree. Lindell and Whitney (2000) found that females intended more adjustments in the face of risk. Similarly, Ronan, Crellin, and Johnston (2009) found females to have more correct knowledge on which to make decisions and base their perception of risk. They also found females to have a better perception of risk than their male counterparts. Tomio, Sato, Matsuda, Koga, and Mizumura (2014) found female heads of household have greater preparedness in a study in Japan; however, two Turkish studies found no significant difference in the genders (Oral, Yenel, Oral, Aydin, & Tuncay, 2015; Tekeli-Yeşil, Dedeoğlu, Braun-Fahrlaender, & Tanner, 2010). Gender differences have been discussed in the context of preparedness. For example, Cutter, Tiefenbacher, and Solecki (1992) discussed male risk-taking behaviors and female risk-avoidance being pertinent to preparedness activities in certain contexts (also discussed by Dahal & Hagelman, 2011).

Information concerning age as a factor in preparedness is a bit more stable across the literature with most of the studies reviewed showing that age is positively related to preparedness (Lindell & Whitney, 2000; McNeill, Dunlop, Heath, Skinner, & Morrison, 2013; Miceli, et al., 2008; Mishra & Suar, 2005; Pampel, 2012; Sattler, et al., 2000; Tomio, et al., 2014). However,

not all studies show that age is significant. For example, Oral, et al. (2015) found age to be insignificant when researching earthquake preparedness in Turkey. Research by Paul and Routray (2011) was a bit different than most when looking at the correlation between age and preparedness. They found younger persons in Bangladesh were more likely to have stores of food in preparation for a cyclone whereas older persons would adjust eating habits by having fewer meals during a disaster. Al-Rousan, Rubenstein, and Wallace (2014) found increasing age to be associated with poor levels of preparedness. Other researchers had a non-linear model. For example, Boscarino, Adams, Figley, Galea, and Foa (2006) found those between the ages of 30 and 64 were more likely to be prepared for a terrorist event. Likewise, FEMA (2014) studies found those 35-74 were most likely to be prepared, while those ages on either side were less likely to be prepared.

Formal educational levels have been reviewed in many studies. As opposed to targeted information concerning disaster preparedness or disaster education, this variable looks simply at the educational level of the participant. The Wirthlin Worldwide (2004) study found those with lower levels of education rank the need to prepare higher than those participants with higher levels of education. Contrary to this finding, some studies indicate a positive relationship between higher levels of formal education and preparedness (Farley, Barlow, Finklelstein, & Riley, 1993; Lee & Lemyre, 2009; Mishra & Suar, 2007). Likewise, Tomio et al. (2014) found that college graduate heads of household were more likely to take preparedness steps than those with lower levels of education. Other studies, however, do not show that those with higher levels of education are necessarily more prepared. Some found educational level was not significant (Kim and Kang, 2010; Oral et al., 2015), and others found a non-linear correlation with persons with some college being more apt to take preparedness action than those with lower

or higher educational levels (Eisenman, Wold, Fielding, Long, Setodji, Hickey & Gelberg, 2006). Pampel (2012) also had non-linear results concerning educational levels and preparedness.

The Wirthlin Worldwide (2004) study found that persons with lower household incomes ranked the need to prepare higher than those with higher household incomes. The Peter Hart (2005) research had similar findings. Although the lower-income groups ranked a need to prepare higher, other studies show that it is not often executed. Several studies show a positive correlation between income levels and preparedness efforts (Borque, Miletti, et al., 2012; Pampel, 2012; Sattler, et al., 2000). One study by Mishra and Suar (2005) had mixed results based on emergency type. For a heat wave, they found income to be non-significant; however, for flooding, they found a positive correlation between income and preparedness. Others have found income levels to be insignificant to preparedness (Kim & Kang, 2010; Tekeli-Yeşil, et al., 2010).

The Wirthlin Worldwide (2004) study found blacks and Hispanics ranking the need to prepare higher than white counterparts. Eisenman, et al. (2006) had similar findings. Eisenman and his colleagues found blacks and Latinos were more associated with having emergency supplies. Furthermore, they found black participants were more likely to have emergency plans than other race/ethnicities. Directly opposed to this finding, Pampel (2012) found blacks, Hispanics, and Asians to have lower preparedness scores than whites. Several studies have found no significant difference across racial or ethnic groups (Borque, Regan, et al., 2012; Peter Hart, 2005).

Factors that Impact Preparedness

Aside from general demographic information such as age, gender, and race, there are factors that are specific to disasters that can have an impact on preparedness. Having previous experience with a disaster should inform future experiences. Furthermore, receiving specific information or education on disasters should inform future actions.

It would seem that previous experience with disasters would motivate persons to action. A study by Allstate (2014) showed as many as 92% of Americans have lived through some type of disaster. Many other studies have shown that previous experience is a motivator to preparedness action (Boscarino, et al., 2006; Mishra & Suar, 2007; Oral, et al., 2015; Sattler, et al. 2000; Tekeli-Yeşil, et al., 2010). Horney, Snider, Malone, Gammons, and Ramsey (2008) found previous experience to indicate greater likelihood of having both a disaster kit and an evacuation plan. As is discussed later, cognitive biases may interfere with experience making a difference in preparedness. As an example, some studies show that previous experience with disaster does not impact preparedness (Perez-Fuentes & Joffe, 2015). Takao, Motoyoshi, Sato, Fukuzondo, Seo, and Ikeda (2004) found that previous experience with flooding in Japan had no significant impact on preparedness for future floods.

The literature shows that merely providing information does not apparently increase preparedness (Perez-Fuentes & Joffe, 2015; Rohrmann, 2003). Dissemination of information must be effective in communicating risk; however, this may not be enough to move individuals to action (Rohrmann, 2003, 2004; see also Fischer, Pavlova, & Colvello, 1991; Gaull, 1997; Rohrmann, 1992, 1999). Persons who have received information or participated in training sessions concerning preparedness have shown increased propensity for preparedness actions (Miceli, et al., 2008; Ronan, Crellin, & Johnston, 2009, 2012). Not all studies have shown this

correlation, however. For example, Paton (2003), found no significant correlation between providing members of the public with information on hazards and potential mitigation efforts with preparedness. Paton's study concluded that public hazard education programs might actually reduce perceived levels of risk. A Zogby poll (2013) found that people believe themselves educated on preparedness; however, the same poll shows only one-in-three has an actual preparedness plan. Education and information may have some impact; however, it is not moving citizens to action.

In addition to past experience and access to information, training, or education, it is important to examine how persons perceive risk. If there is no risk perceived, there can be no action expected, for an action (or reaction) is predicated on the perception of some risk to the perceiver.

Risk Perception Impact on Preparedness

Preparedness must be precipitated by awareness (Kapucu, 2008). In order to be prepared for a disaster or response to a disaster, the implications of the disaster should be known. Additionally, before people can prepare, they must be aware of the potential threats, the likelihood of occurrence, and the problems associated with a lack of preparedness, which can motivate a group to action. This awareness is predicated on the perception of risk.

The study of risk perception has been defined in previous studies as "the investigation of people's awareness, emotions, and related behavior in response to any hazard" (Kittipongvises & Mino, 2015, p. 60; see also Kellens, Zaalberg, Neutens, Vanneuville, & De Maeyer, 2011).

In many studies, perception of risk has been shown to positively correlate with preparedness activities (Borque, Regan et al., 2012; Farley et al., 1993; Kim & Kang, 2010; Lee & Lemyre, 2009; McNeill et al., 2013; Mishra & Suar, 2007). Other studies, however, show no

significant correlation. For example, Lindell and Whitney (2000) found no significant correlation between risk perception and adoption intention or actual adoption of adjustments to seismic risks. Likewise, Tekeli-Yeşil et al. (2010) found risk perception not significant to preparedness.

FEMA (2014) studies show that perception of risk may be mediated by several other variables. Persons aged 35-74 were shown to have a greater perception of risk than those in age categories lower or higher in age; however, the younger group (18-34) had a greater perception of how severe disasters could be should they strike. The severity appears linear across disaster type with younger respondents believing in greater severity and the perceived severity diminishing with each older group. It also appears the older group in the study (age 75+) perceives the efficacy and helpfulness of preparedness as less than their younger counterparts.

It could be that the perception of a specific risk must be tied to some temporal measure to increase action or reaction to the risk. For example, people who live near an active seismic fault may perceive the risk but not be moved to action unless they believe the threat of danger is imminent. This would tie to cognitive biases, which are discussed below.

While it is important to understand how to prepare, and how many people prepare, a common-sense pairing to these topics would be what barriers or impediments exist that would deter preparedness efforts.

Impediments to Preparedness

FEMA (2014) preparedness studies have shown less than 25% of respondents reported no barriers or impediments to preparedness. A 2011 study by FEMA showed 26% of the participants believed preparing is too costly; 24% did not know how to be prepared; 18% claimed to lack the time to prepare; and 17% believed it was too difficult to get information on

proper preparedness. It is important to note the responses in the FEMA study are based on respondents selecting pre-formatted answers rather than free-text responses that have been through some type of content analysis. The limitation is that the responses may be suggestive and impart some biases on the part of the respondent.

The Wirthlin Worldwide (2004) study also examined impediments to preparedness. In rank order, their findings indicated the following given reasons:

- don't know where to go / not available (20%);
- not concerned / not necessary (19%);
- already feel prepared (18%);
- too busy / no time (17%);
- have not thought about it (15%).

At least two of these reasons ("not concerned/not necessary" and "already feel prepared") could be indicative of optimism bias, as is discussed in more detail below. Likewise, the Hart Research (2005) found a majority of people (54%) believed a disaster would never happen to them.

The Hart Research (2005) showed impediments to preparedness as including cost (37%), time (35%), and information (44%) – despite extensive readiness campaigns from both public and non-profit sector entities. The stark reality from the Hart Research is, "most Americans have yet to be personally motivated to prepare for what may be ahead" (p. 7). Research is showing that part of the lack of motivation may rest in cognitive biases.

Cognitive Biases in Risk Perception

Research involving preparedness is showing that providing information to educate individuals on the risks of disasters is insufficient to motivate preparedness behavior; other

impediments exist (Dufty, Taylor, & Stevens, 2012; Lindell & Perry, 2000; Perez-Fuentes & Joffe, 2015). Cognitive biases have certainly emerged as identified impediments to the perception, identification, and acceptance of risk and preparing for such risk (Perez-Fuentes & Joffe, 2015). Yudkowski (2008) also provides an informative discussion on biases and heuristics as they apply to the judgment of risk.

Daniel Kahneman and Amos Tversky were pioneers in the field of cognitive biases (e.g., see Kahneman & Tversky, 1972; Tversky & Kahneman, 1973, 1974). While much of their work was adopted by the fields of evolutionary psychology and economics, the idea of biases causing an underestimation of risk spread to other applicable disciplines. Paul Slovic was an early adopter of the work of Kahneman and Tversky as it applied to the perception of risk (see Slovic, 2010). From the early work of Kahneman and Tversky in the early 1970s, through the specific risk-based use by Paul Slovic, until the most recent discussions by Robert Meyer and Howard Kunreuther in their 2017 book *The Ostrich Paradox: Why We Underprepare for Disasters*, the idea of psychological biases creating an impediment to a full understanding or measurement of risk has gained wide acceptance. Furthermore, these biases have been seen in previous studies involving planning and preparedness (see, for example, Avery, et al., 2008; Carpenter, et al., 2012). Robert Meyer, in discussing biases that lead to lack of proper preparation, states, "over the past four decades a sizeable academic literature has emerged warning of the inherent weakness that exist [sic] when individuals – both planners and residents – are faced with making decisions about protection from low-probability, high-consequence events" (2006, p. 153).

Cognitive biases are best described as identifiable deviations from rational or normative judgment causing the perceiving individual to draw illogical inferences about persons or situations (Haselton, Nettle, & Andrews, 2005). Tversky and Kahneman (1974) explain that

cognitive biases are the result of using shortcuts in thought that will lead to incorrect or illogical decisions. Rooted in psychology, cognitive biases can override concrete information or hard statistical probabilities to guide human behavior (Meyer & Kunreuther, 2017).

Meyer (2006) discusses that humans have instinct to learn through trial and error – repeat what gives good results and eschew what gives bad results. However, he notes that this method does not work well for situations where replications are few and far between and feedback is often not clear – as low-probability high-consequence events. An illustrative example provided by Meyer (2006) concerns the potential evacuation issues in New Orleans that were noted during Hurricane Ivan in 2004 and those exact same issues being present in 2005 for Katrina. As Ivan did not require the evacuation, any potential lessons to be learned were (apparently) overlooked. Meyer states, "we are much better at learning from the mistakes we actually make than those we *almost* make" (2006, p. 154, emphasis in original). Browne and Hoyt (2000) discuss research findings that suggest a strong correlation between the decision to purchase flood insurance and the occurrence of flood losses the previous year. The bias being that if no damage had been suffered, then the expense of flood insurance may not be necessary.

Another bias may lie in the over-reliance on short-term feedback. An example is given by Meyer concerning Hurricane Wilma's impact in South Florida in October of 2005. Residents had been given ample warning of the approaching storm. Additionally, they had abstract knowledge of the damage and chaos potentials (Hurricane Katrina should have been fresh in the minds of all Americans). Despite the warnings and knowledge, long lines of people formed for supplies when a boil-water advisory was issued – the residents had not prepared. This failure to prepare frustrated Governor Jeb Bush, who stated, "People had time to prepare. It isn't that hard to get 72 hours' worth of food and water. (October 26, 2005). Meyer points out that the residents

had experience in preparing for storms, but they had very little experience in recovering from storms. This difference caused many to fall short in preparations as many prior warnings had resulted in little effect. This experience overrode any warnings of what could happen.

Notwithstanding the problems associated with near-misses and false alarms, cognitive biases may play a negative role when we do the right thing. For example, by preparing and mitigating potential issues associated with an event, the feedback on the severity of the event is necessarily lessened by design. However, this lessening of impact may have detrimental effects on how people perceive the need to prepare and reduce the memory of how bad an event could have been. As Meyer (2006) was quoted above, people may learn better from mistakes than from almost mistakes. This is not to say that such cognitive biases are so deeply entrenched in the psyche of public that they cannot be overcome. Meyer and Kunreuther (2017) state, "while we may not be able to alter our cognitive wiring, we *may* be able to improve preparedness by recognizing these specific biases and designing strategies that anticipate them" (p. 12, emphasis in original).

Meyer and Kunreuther (2017) have forwarded a proposal stating decades of disaster research leads to a conclusion that six specific cognitive biases are potentially key explanations for the lack of preparedness for disasters seen among organizations and individuals. These biases will be explored in the current study. The identified biases (myopia, amnesia, optimism, inertia, simplification, herding, and measuring) are fully described below (p. 12):

1. *Myopia Bias – a tendency to focus on overly short future time horizons when appraising immediate costs and the potential benefits of protective investments;*
2. *Amnesia Bias – a tendency to forget too quickly the lessons of past disasters;*

3. *Optimism Bias – a tendency to underestimate the likelihood that losses will occur from future hazards;*
4. *Inertia Bias – a tendency to maintain the status quo or adopt a default option when there is uncertainty about the potential benefits of investing in alternative protective measures;*
5. *Simplification Bias – a tendency to selectively attend to only a subset of the relevant factors to consider when making choices involving risk; and*
6. *Herding Bias – a tendency to base choices on the observed actions of others.*

Each of the biases identified by Meyer and Kunreuther in their 2017 book, *The Ostrich Paradox: Why we Underprepare for Disasters* are discussed more completely below to aid in fully understanding.

Myopia Bias. Meyer and Kunreuther (2017) discuss the short-sightedness many have concerning taking steps for protection. In some ways the myopia bias may manifest itself as procrastination or kicking the can down the road – a failure to look to the future. The myopia bias may be viewed in two ways. The first is through the economic lens of hyperbolic discounting – placing more value on immediate gratification than on better returns with long horizons. Reviewing myopia through this lens is more concerned with immediacy and short-term gratification. The other manner Meyer and Kunreuther discuss is viewed through the lens of Trope and Liberman's temporal construal theory, which accounts for the difference between concrete current challenges or rewards as opposed to some abstract or hypothetical future threat or reward. Meyer and Kunreuther (2017) succinctly state, "one of our greatest weaknesses as decision makers is that our intuitive planning horizons are typically shorter than that needed to see the long-run value" (p. 19).

Amnesia Bias. While the myopia bias is concerned with a failure to look to the future, amnesia bias is concerned with a failure to remember and learn from the past. While humans are wired to learn many skills and lessons through trial and error, such learning does not translate with low-probability, high-consequence events. As these events are fewer in number and temporally farther apart, memories are not very fresh, raw, or painful for use in decision making. This is exacerbated by the simple fact that taking protective actions may prevent painful stimulus from occurring, therefore dulling senses to the potential for harm – a terrible paradox. There is little, if any, positive reinforcement in successfully and proactively taking protective actions. While communities remember tragic events such as the terrorist attacks of September 11, 2001, or the impact and resulting flooding and mayhem caused by Hurricane Katrina, the rawness of the emotion, which would act as a stimulus to action, quickly fades (Meyer & Kunreuther, 2017).

Amnesia bias can also be manifest when the taking of protective action does not bring about any benefit. If a person is warned of a coming storm, takes the laborious steps of boarding up a house, and evacuates the family and pets at some expense only to have the impact be minimal and the efforts, in retrospect, unneeded, the person's sense of need to prepare or heed the warnings in the future will likely diminish. This is exemplified in "cones of uncertainty" in hurricane forecasts where more people are warned than will be impacted. The reason seems logical; however, the impact of a non-event can be detrimental to preparation for future events.

Optimism Bias. In its most simple form, optimism bias can be summarized as "it will not happen here" or "it will not happen to me." Optimism bias stems from a person's unrealistic thought that they are somehow immune to threats and risks (Meyer and Kunreuther, 2017). Neil Weinstein's 1980 research of the phenomenon, which he labeled "unrealistic optimism," is one of the hallmark studies. This bias causes people to be unrealistically optimistic concerning their

own risk, thereby underestimating their actual risk. The Weinstein hypothesis was "People believe that negative events are less likely to happen to them than to others, and they believe positive events are more likely to happen to them than others" (Weinstein, 1980, p. 807). His research accepted this hypothesis and found the magnitude of the optimism bias varied based on the posed event. The bias is seen as unrealistic optimism, as the probabilities for occurrence would be the same for two similarly situated individuals; however, the participant views their risk position as better than that of others (see also: Sharot & Garrett, 2016). Meyer and Kunreuther (2017) advise that a serious reason for excessive optimism may be found in "motivated reasoning," which they define as "a tendency to selectively gather and process information that is most congruent with a desired goal or outcome" (p. 39, citing Kunda, 1990).

Inertia bias. Meyer and Kunreuther (2017) explain when people are faced with conflicting goals and "difficult choices under risk and uncertainty" (p. 44) the inertial tendency is to do nothing – to make no choice; however, as a 1980 song claims, "If you choose not to decide, you still have made a choice" (Peart, Lee, & Lifeson, 1980). The desire to select some default action is "one of the most robust biases in decision making" (Meyer & Kunreuther, 2017, p. 45). One of the key studies that illustrated the phenomenon was conducted by Johnson, Hershey, Meszaros, and Kunreuther (1993), where the tendency was found to maintain the status quo rather than consider all options and make a more informed decision.

Meyer and Kunreuther (2017) point out that a default option is useful when quick decisions must be made in order to prevent being mired in an *analysis paralysis*. If decision-making capabilities become mired down, the brain will often opt for a default decision or status quo to move forward; however, this may be dangerous in critical situations or where decisions concern high-stakes issues.

The bias to favor status quo or a default status may be compounded by the psychological phenomenon of loss aversion. Meyer and Kunreuther (2017) discuss the work of Kahneman and Tversky, who, in the 1970s, amassed evidence to show two distinct features of human judgement:

> "1. A tendency to value things to a reference point, which often is the status quo; and
>
> 2. A tendency to see a negative change from the reference point (losses) as being much more painful than an identical positive change (gains)" (p. 47-48, citing Kahneman & Tversky, 1979)

Meyer and Kunreuther put it more succinctly: a gambler is more often more upset by losing $100 than he or she would be happy by winning $100 (p.48). Although the magnitude of the change is the same, the negative direction is perceived as a greater magnitude than the positive direction. Thus, people will often give the spending of some resource greater weight than the potential good that will come from such expenditure.

Simplification bias. Meyer and Kunreuther (2017) explain simplification bias by discussing thresholds of concern. They use an example of motorcyclists not considering the possibility of an accident in their calculus as to whether or not to don a protective helmet when riding the motorcycle. The possibility of an accident occurring is remote, thus it falls below the operator's threshold of concern and perhaps does not come to mind when weighing pros and cons. However, studies have shown that given actual low-probability numbers, people will inflate the probability (Meyer and Kunreuther, 2017). Without concrete numbers, however, the low probability becomes vague. It is the vagueness that results in the discounting of the probability in favor of what is immediately present. Additionally, the mind tends to gravitate toward items needing immediate attention and those of high probability, and as has been

discussed, disasters by their very nature are low-probability and high-consequence events. The low-probability portion creates barriers to address the high-consequence portion.

Thresholds are not the only consideration in the realm of simplification bias. A secondary bias that feeds the overarching simplification bias is the single-action bias. Meyer and Kunreuther (2017) explain the single-action bias as taking one action toward a goal may diminish the likelihood of taking further efforts. Concern over a perceived issue creates a friction. Taking one step (a single action) that helps to mitigate the issue a small degree is perceived as "good enough."

Herding bias. Meyer and Kunreuther (2017) point out that following the herd - doing as the crowd does - can be helpful in certain informed situations. Examples could include vaccinations and social norms against smoking. In the absence of information, however, the effects of following the mass of uninformed could be problematic or disastrous. They cite studies from 1978 (Kunreuther, Ginsberg, Miller, Sagi, Slovic, Borkan, & Katz), 2012 (Morsink & Guertz), and 2013 (Lo) that showed individual decisions to purchase insurance was based more on what friends and colleagues were doing rather than a cost-benefit analysis of need. Although vaccinations were listed previously as a potential form of herding (in an informed group), the opposite was seen when a later-debunked study claimed that vaccinations caused neurological disorders. Pertussis vaccination rates plummeted in the United Kingdom from 81% uptake to 31%, and pertussis epidemics resulted (Gangarosa, Galazka, Wolfe, Philips, Miller, Chen, & Gangarosa, 1998, as cited in Meyer and Kunreuther, 1997). A 2013 study of hurricane preparedness by the Red Cross found that one of the factors "most closely associated with being prepared" is having close friends who have taken steps to prepare. The herding bias may cause excessive risk-taking or risk-aversion behavior, dependent on the movement of the herd.

The strength of this bias is illustrated in a 2012 study by Kunreuther, Meyer, and Michel-Kerjan. In the study participants were asked to simulate spending for mitigation efforts; however, they could see what others in their "community" were doing. The decisions proved to be heavily influenced by the perceptions of the actions of others. Even when a group of participants was told the secret percentage of how much funds should be used where in order to be most successful, they eschewed the information in favor of what the group was doing.

Current Research

The purpose of the current research is to explore the level of preparedness among a group of first responders and explore possible impediments to greater levels of preparedness. The research will also review demographic variables (e.g. gender, age, race, education) that showed conflicting results in the literature as to their correlation with individual preparedness. Cognitive biases as identified by Meyer and Kunreuther (2017) will be explored to see what impact they have on first response personnel and their levels of preparedness. The overarching questions to be explored are: Are first responders prepared, and if not, why not?

The following chapter will describe the methodology of the research to include selection of a study population, criteria for a survey instrument, metrics and methods for measuring the identified study variables, and plans to best analyze the data.

Chapter 3

Methodology

This study explores how prepared first responders (i.e., law enforcement officers, firefighters, emergency medical personnel) are for disasters. The study is not focused on the larger first response organization; rather, the research will focus on first responders in their individual capacities. As was shown in Chapter 2, the copious research shows that members of the general public are not well prepared. First responders, as a subset of the larger population, have specific requirements and expectations placed on them by the public. Are they prepared to meet the requirements of their profession in the case of a disaster?

Should the research show that there is some deficiency in preparedness amongst first response personnel, the research will attempt to identify barriers to such preparedness. In addition to barriers concerned with investment of time or money, the research will focus on six specific cognitive biases discussed by Meyer and Kunreuther (2017) as specific barriers to preparedness. If evidence of cognitive biases is found in the study population, the data will be explored to identify which bias, if any, is most predominant.

The research will be conducted via use of individual surveys. While acknowledging the literature concerning potential limitations with the use of self-reported data, it is determined that this method is the best to gather the data desired, as the topics do not lend themselves to direct observation by the researcher. Furthermore, the data could not be reliably captured through peer or supervisor ratings, as these persons would not be expected to have first-hand knowledge of the data sought in the study. The survey instruments will be provided to individual first responders at their workplace in coordination with and cooperation of the respective employing agencies.

Description of Participants / Study Population

Gwinnett County, Georgia, is in the northeast portion of the metropolitan Atlanta region. The county encompasses over 430 square miles and is home to over 270,000 households and almost 900,000 residents, almost 25% of whom are foreign born (United States Census Bureau, 2015). Once the fastest growing county in the United States, Gwinnett County transformed from a rural county in the 1970s to a suburban county – the second most populated county in Georgia. Within the county, there are sixteen incorporated municipalities.

The study has been narrowed to those municipalities that provide full-time police services to their residents through regular employees of the city (as opposed to those who may contract for police services). Of the sixteen cites in Gwinnett County, nine fit this category. Of the nine, only six of the cities are wholly situated in Gwinnett County. Three cities have varying portions of their city which are in Gwinnett; however, the largest percentage of their land mass is in a neighboring county. One city is removed from the study due to the researcher's employment with the city, the potential ethical issues, and the potential for researcher or participant biases. The remaining five cities chosen for the study employ an aggregate of 214 full-time sworn police personnel. This is depicted in Table 3.1.

In addition to the law enforcement component, fire and emergency medical services are included in the study. Fire and emergency medical services are provided to the cities by the Gwinnett County Fire and Emergency Services ("fire department"). The emergency medical component of first response in Gwinnett County is a function of the fire department, which operates a public fire-based emergency medical service. The fire department operates 31 stations; however, only personnel assigned to the stations that serve the five identified cities will be included. While the entire incorporated area of any particular city may be served by several

fire stations, the fire station(s) that have first response responsibility for the majority of the landmass of the city will be included in the study. The fire stations included are listed in table 3.2, and maps of the areas are included as figures 3.1 through 3.5 below.

Table 3.1

Gwinnett County, Georgia, cities chosen for the study and the number of full-time sworn police officers employed by each.

City	Sworn Police Employees
Duluth	56
Lilburn	32
Norcross	44
Snellville	44
Suwanee	38
Total	**214**

Note. The information in this table was collected by contacting the Chiefs of Police of each agency.

Table 3.2

Fire Stations serving the Gwinnett County, Georgia, cities chosen for the study.

City	Gwinnett Fire Station(s)
Duluth	7, 19
Lilburn	2, 25
Norcross	1, 11
Snellville	12
Suwanee	13

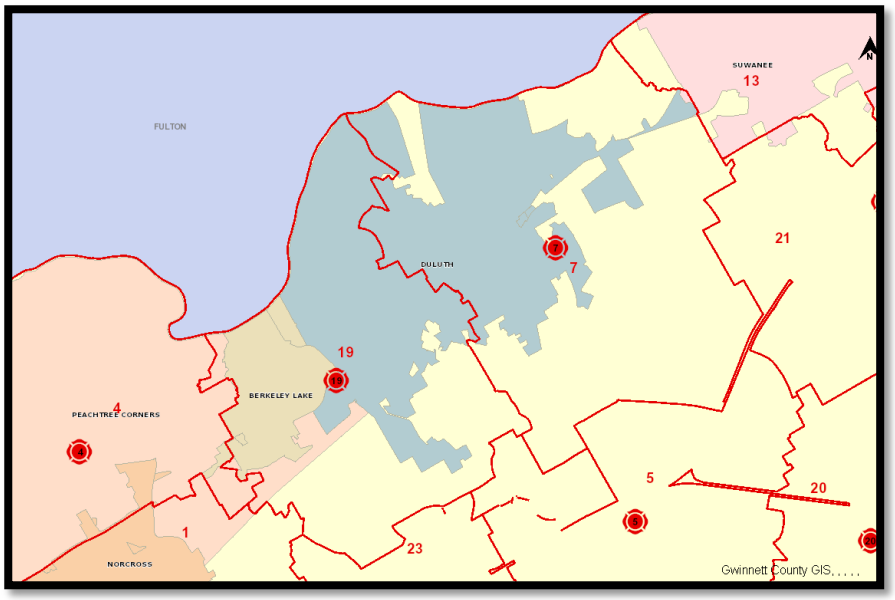

Figure 3.1: City of Duluth fire and EMS coverage

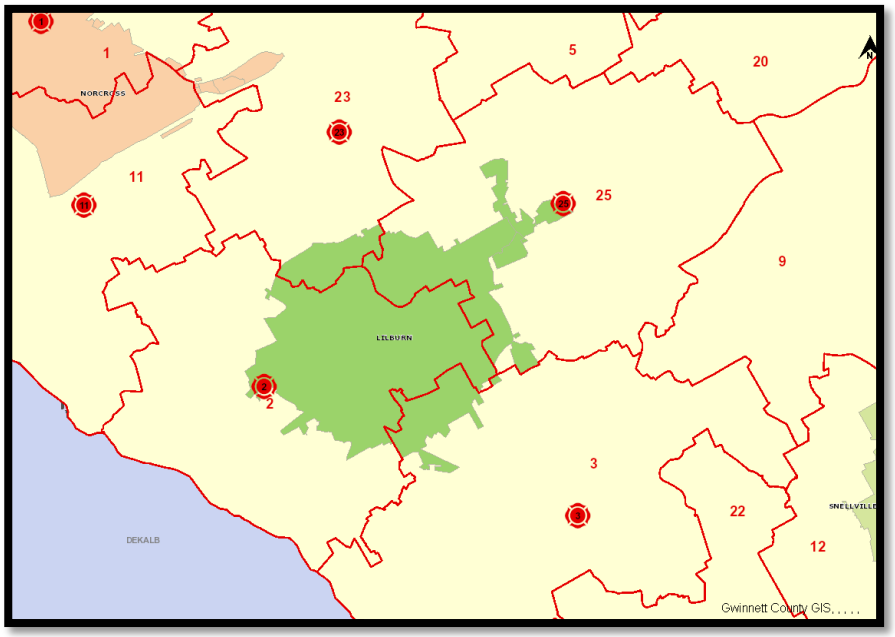

Figure 3.2: City of Lilburn fire and EMS coverage

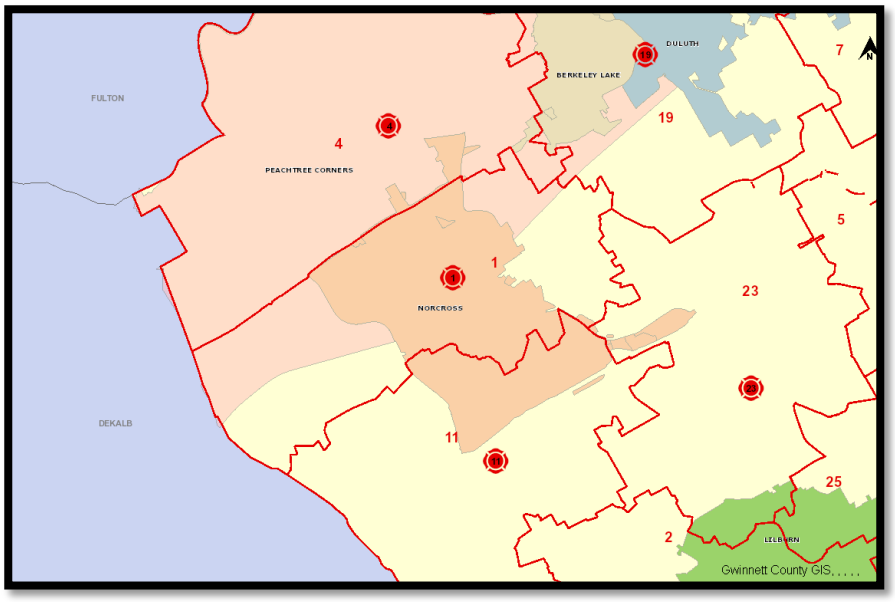

Figure 3.3: City of Norcross fire and EMS coverage

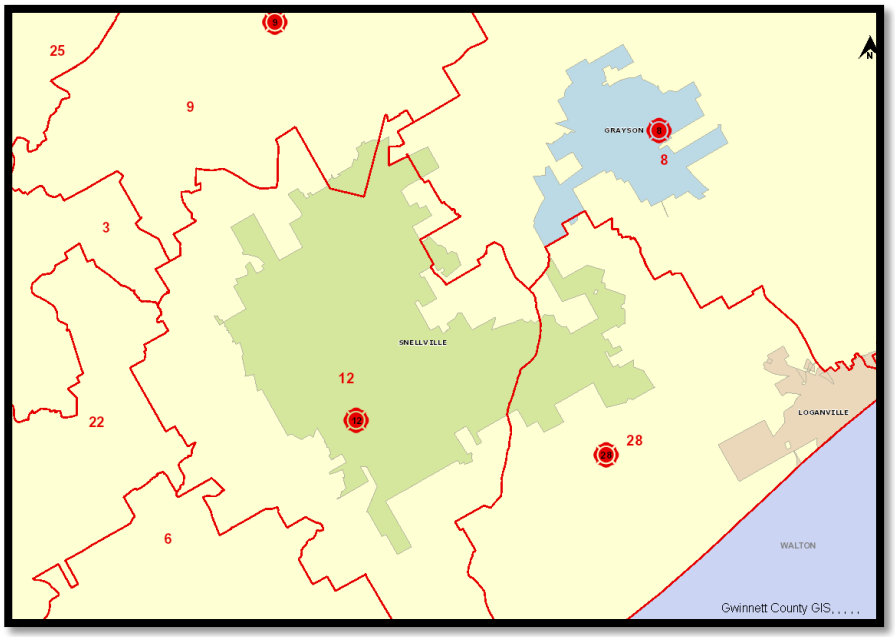

Figure 3.4: City of Snellville fire and EMS coverage

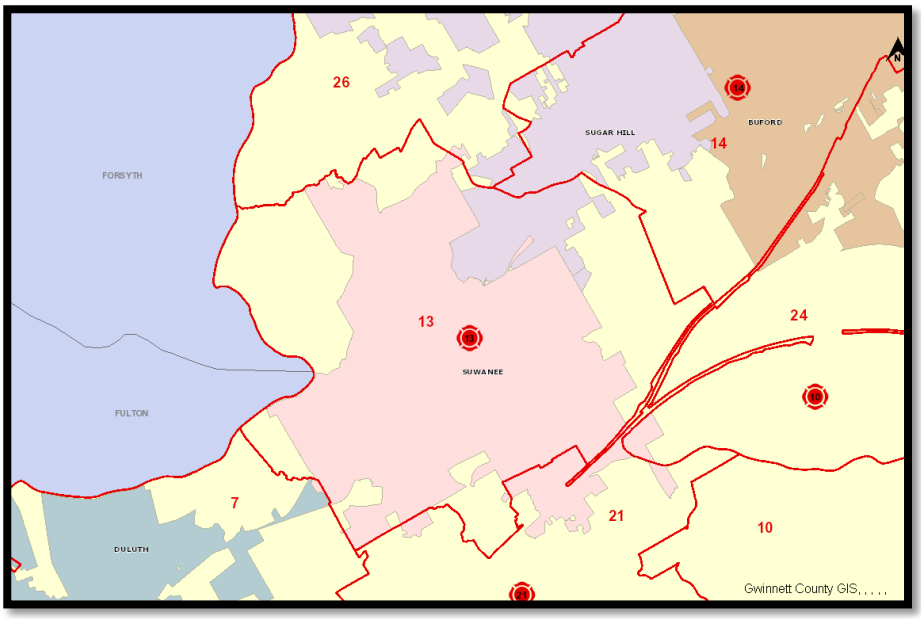

Figure 3.5: City of Suwanee fire and EMS coverage

Gwinnett County Fire and Emergency Services provided the number of personnel assigned to each station. The numbers of personnel are depicted in table 3.3.

Table 3.3

Number of personnel assigned to fire stations in the study

Fire Station	Number of Personnel Assigned
1	16
2	16
7	26
11	26
12	26
13	16
19	16
25	16
Total	158

Survey Instrument

The survey instrument utilized in the present study was designed to capture data that is responsive to the research questions. The survey, which is found in Appendix A, consists of four distinct divisions or parts. Each of the parts will cover a distinct portion of questions related to the present research.

The first part of the survey consists of a self-assessment of individual preparedness followed by specific questions on specific preparedness activities (e.g., CPR training, emergency kit ownership) that were identified in the literature as indicative of overall preparedness. The activities and items listed are taken from preparedness sources such as the Federal Emergency Management Agency's [FEMA] ready.gov website and the American Red Cross's [Red Cross] "Red Cross Ready" campaign material. The preparedness activities and items will be used to create a preparedness index similar to the methods used by Kapucu (2008).

The second part of the survey consists of thirteen statements that participants will be asked to rate using a five-point Likert scale, where "1" is strongly disagree and "5" is strongly agree. The statements are designed to identify motivators and barriers to preparedness. The statements are taken, in large part, from the FEMA Preparedness in America studies (2014, pp. 61-62).

The third portion of the survey consists of seven statements designed to illustrate the six cognitive biases identified by Meyer and Kunreuther (2017) as being the cause for failure to prepare. As previously discussed, the biases are:

1. *Myopia Bias – a tendency to focus on overly short future time horizons when appraising immediate costs and the potential benefits of protective investments;*

2. *Amnesia Bias – a tendency to forget too quickly the lessons of past disasters;*
3. *Optimism Bias – a tendency to underestimate the likelihood that losses will occur from future hazards;*
4. *Inertia Bias – a tendency to maintain the status quo or adopt a default option when there is uncertainty about the potential benefits of investing in alternative protective measures;*
5. *Simplification Bias – a tendency to selectively attend to only a subset of the relevant factors to consider when making choices involving risk; and*
6. *Herding Bias – a tendency to base choices on the observed actions of others.* (p. 12)

Each of the seven statements in the survey instrument is designed to describe one of the biases in a self-proclamation form. The statements are presented twice. The first set of statements is presented with instructions for the participant to respond how the statement is considered by the participant as it would relate to the participant's current state of preparedness. The possible responses make use of a five-point scale, from "Not at All" to "Extremely." The second set of cognitive bias statements is presented with instructions for the participant to respond to the degree each statement represents a barrier to preparedness. The responses are on a five-point scale from "Not at All a Barrier" to "An Extreme Barrier."

The fourth and final part of the survey includes demographic data about the participant. Outside of questions concerning the employment of the participant (e.g. type of first responder, time in job, position in agency), the demographics are taken from the discussions in the extant literature concerning how the variables may predict

preparedness. While not a major portion of the present study, the literature revealed these variables are worthy of investigation and discussion.

Presentation of the Survey

The research was introduced to the participants with the aid of the departments that employ the participants. Introductory letters were sent to all potential participants by the agency head or member of the agency administration a few weeks before the surveys were scheduled. A sample of the introductory letter is found in Appendix A. Four times were scheduled with each police department (two times per day on two separate days). The times were scheduled in consultation with the agency-head or member of the agency command staff in order to give the researcher exposure to the most personnel at each department.

Each of the eight identified fire stations works on a schedule of 24-hours on and 48-hours off, thus each station is staffed by three shifts (named "A" "B" and "C"). The fire stations were visited once per day for three consecutive days in order to meet with each shift of the station. The exact dates of visits were coordinated with the fire department administration.

Survey instruments were presented to participants in person at their workplace. In person presentation was chosen in hopes of maximizing response rate. The instruments were presented and collected on-site; however, the researcher was not present in the room while participants completed the surveys. Participants were asked not to discuss the survey during the taking of the survey. Some reasons for members of the identified population not taking the survey included being away from the station on a call or away for vacation or training.

Once collected, survey data was taken from the physical paper surveys and was input into a database to allow for more effective and robust analysis of the data.

Analysis of the Data

Individual variables captured in part I of the survey instrument will be discussed using descriptive statistics. Additionally, many of the data points collected in part I will be used to create a preparedness index in order to gauge a level of preparedness for the participants. This preparedness index will be compared against various demographic variables collected in part IV of the survey instrument.

The barriers and motivators found in part II of the survey are to be examined to find common themes among the research population in order to inform potential methods for improving preparedness among the population researched. The barriers and motivators can be divided into two distinct impact classifications, external and cognitive. External impacts could be impediments or facilitators (barriers or motivators) to preparedness. External impacts could manifest through resource availability (e.g., time, money, knowledge) or social networks. Cognitive impacts could be manifest in beliefs and attitudes.

Additionally, the cognitive biases represented in part III of the survey will be explored with an eye towards identifying the predominant bias(es) in the research population. By identifying barriers and biases, the research may help in pointing to methods to overcome barriers and biases to increase preparedness.

The initial identification of the participant's identification with each bias statement can be compared to preparedness to look for levels of impediment. This result

may be compared to the self-reported level of impediments shown in the second portion of Part III of the instrument.

Creation of a Preparedness Index

In order to gauge a level or degree of preparedness, the individual variables that are used in part I of the survey instrument in the present study must be combined to arrive at a numerical "score." Using a method similar to that used by Kapucu (2008), some of the responses in Part I of the survey instrument will be given a numerical weight. The ratio of participant answers to the whole amount possible will be used as the index.

Actions and items are given equal numerical weights to ascribe a linear relationship, and the cumulative amount creates the basis for the index. The method used in ascribing values is described below:

The index consists of eight facets, each consisting of a potential of one "point". The maximum possible amount is 8 points. The index will be the average of the answered values. The values are as follows:

CPR Training
Never – 0 points
> 36 months – 0 points
1-36 Months – inversely proportionate with the highest score being 1. The response, *x*, an integer between 1 and 36, will be entered into equation 3.1 to arrive at the data value, *C*:

$$C = 1 - \frac{(x-1)}{36} \qquad \text{Equation 3.1}$$

Review of Readiness Material
No – 0 points
Yes – 1 point

Emergency Plan
No – 0 points
Yes – 1 point

Practiced Emergency Plan
No – 0 points
Yes – 1 point

Emergency Contact Plan	No – 0 points Yes – 1 point
Designated Meeting Place	No – 0 points Yes – 1 point
Individual Kit Items	Total indicated items are divided by the possible items (18) to arrive at a linear scale from 0 to 1.

The dichotomous choice whether or not the participant has an emergency kit is removed from this, as it would be duplicative with the individual kit items, and add more weight to emergency kit to overall preparedness. Use of an index or composite variable made up of these individual items will allow for comparisons with other variables against such a preparedness index, or a gauge of preparedness of the participant. It is expected that this method will allow for a more robust analysis of the data captured in the study. Additionally, this preparedness index more closely shows a measure of actual preparedness level of the participants. This variable may also be compared and contrasted to the self-reported preparedness level.

Influence of Variables on the Preparedness Index

While acknowledging the potential for mediating variables or confounding variables, use of the preparedness index will allow for analysis of influence of other variables on the preparedness index, especially those associated with the cognitive biases. Certainly, this research will not be dispositive of any questions of cause and effect. Likewise, the analysis of correlation of certain variables to a higher preparedness index will not be completely conclusive; rather, this will provide information to inform further research to delve more deeply into the effect certain variables may have on preparedness or on some mediating variable which, in turn, impacts preparedness levels.

Basic Framework for the Study

Figure 3.6 shows the basic framework of the present study, wherein the impact of demographics, impediments, facilitators, and cognition on the level of preparedness is explored.

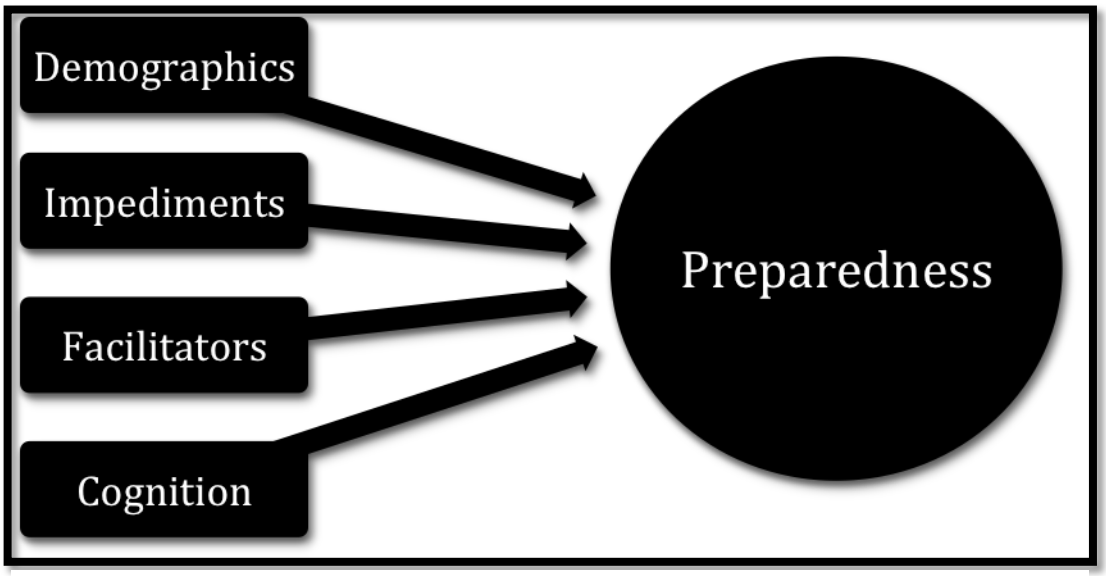

Figure 3.6

Research Hypotheses

Four distinct hypotheses are formulated from the review of the extant literature as it applies to the specific data collected in this study:

H1 – Self-reported preparedness levels of participants will be highly correlated to their actual preparedness level.

H2 – Participants will differentiate between actual considerations and expected barriers, as indicated by significant differences in the mean rating for each cognition attribute.

H3 – Some demographic and experience characteristics will be significantly correlated to and predictive of impediments, facilitators, actual considerations, and expected barriers.

H4 – Demographic and experience characteristics, impediments, facilitators, actual considerations, and expected barriers will be significantly correlated and predictive of reported and actual preparedness levels.

Chapter 4

Analysis and Results

As discussed in Chapter 3, the identified population consisted of 377 first responders in Gwinnett County, Georgia. The identified population consisted of 214 police and 158 fire/EMS (hereinafter, "fire") personnel. A total of 113 police (52%) and 106 fire (67%) completed surveys for an aggregate total of 219 participants (58% response).

Arrangements were made to visit each of the five identified police departments on at least four occasions each in order to administer surveys to sworn police personnel. Participant numbers are shown in table 4.1. Additionally, each of the eight fire stations identified was visited on three occasions (once per day for three consecutive days) in order to capture each shift of personnel assigned to the station. Fire participation is depicted in table 4.2. Some issues that prevented participation included personnel being away from the station on a call or being away from work for leave or training.

Table 4.1

Police Participants

Department	Police Employees	Participants	%
Duluth	67	35	52%
Lilburn	28	9	32%
Norcross	44	30	68%
Snellville	44	22	50%
Suwanee	36	17	47%
Total	219	113	52%

Table 4.2

Fire/EMS Participants

Station	Total Employees	Participants	%
1	16	8	50%
2	16	12	75%
7	26	16	62%
11	26	21	81%
12	26	19	73%
13	16	6	38%
19	16	12	75%
25	16	12	75%
Total	158	106	67%

Participant Demographics

The 219 participants were mostly male (n=199; 91%), married (n=151; 69%), and employed full-time (n=217; 99%). The other captured demographics were more widely varied. These are depicted in figures 4.1 through 4.3.

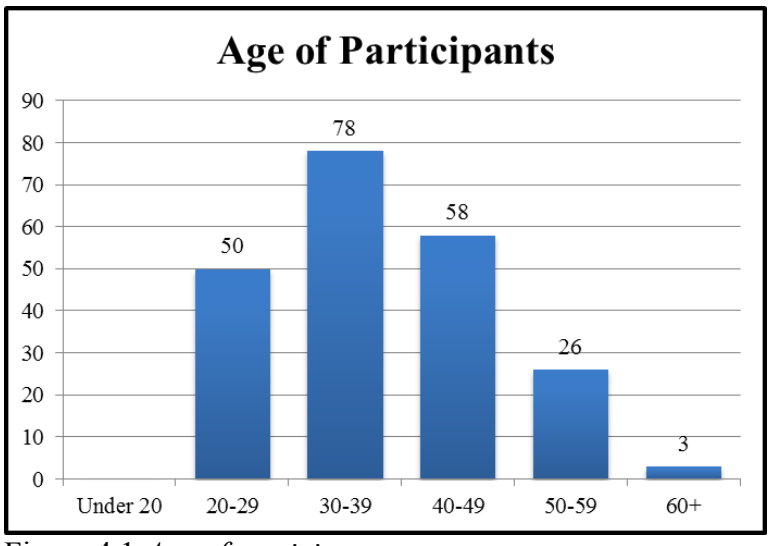

Figure 4.1 *Age of participants*

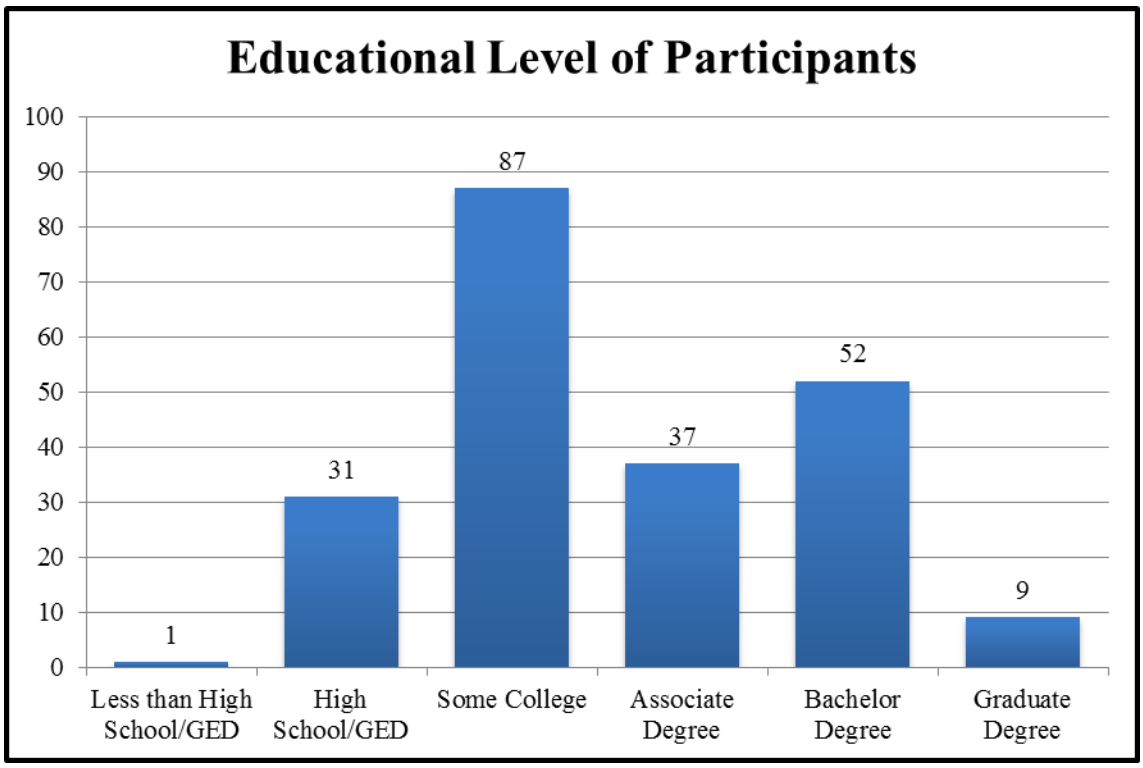

Figure 4.2 *Educational level of participants*

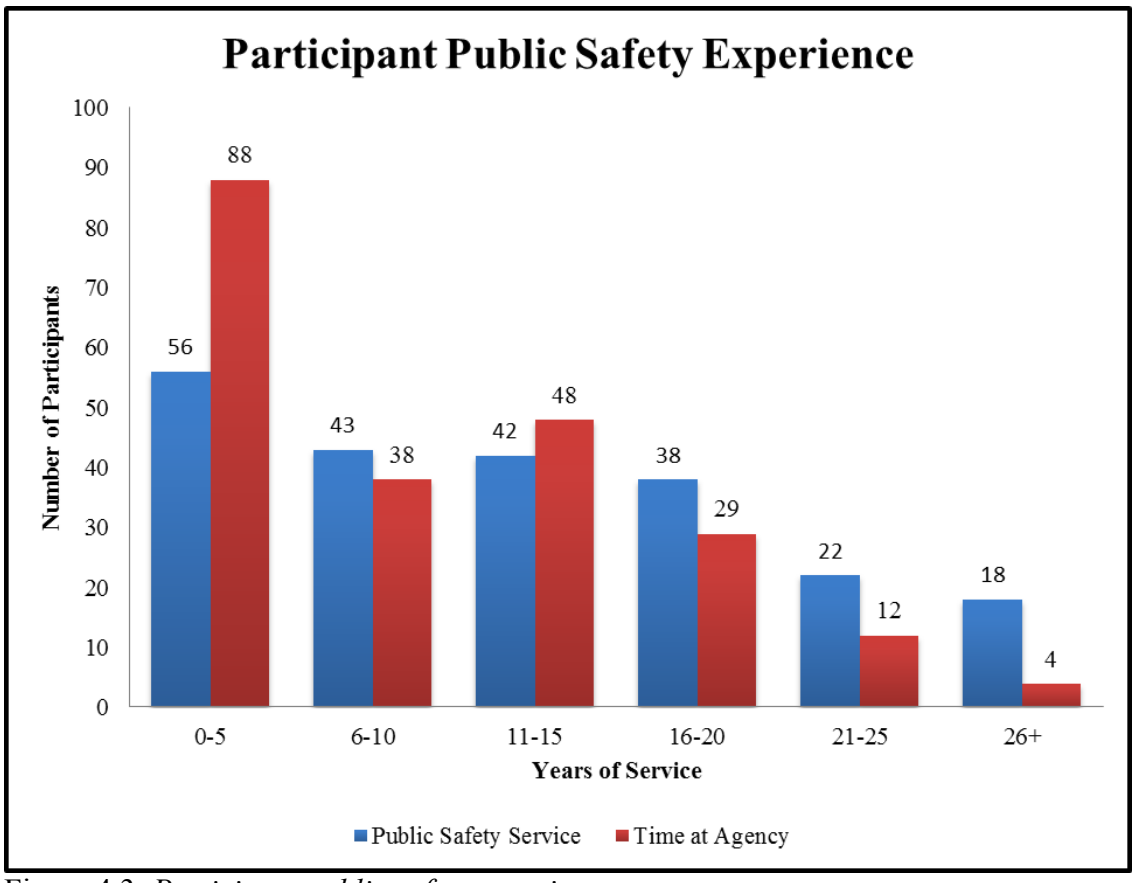

Figure 4.3 *Participant public safety experience*

All 106 of the fire services participants indicated assignment in the operations section of the department. The largest segment of fire services participants was of firefighter ranks. Gwinnett County Fire Services has three ranks or grades of firefighters (I-III), and 52 of the 106 participants were of these ranks (7, 23, and 22 respectively). Participants also indicated ranks of driver/engineer (25), lieutenant (19), captain (6), and battalion or other chief (3).

The police participants were mostly from patrol assignments (n=91; 81%); however, other assignments were indicated: criminal investigations (9), traffic enforcement (8), and administration (4). The majority of the police participants were of the police officer rank (64; 57%). Other ranks indicated were sergeant (21), lieutenant (9), corporal (9), detective (4), and captain or higher (4).

Participants were asked about previous experience with disasters such as a tornado, hurricane, earthquake, or terrorist attack. Responses were closely divided among the participants with 115 (52.5%) indicating previous experience with a disaster. Similar results were seen for fire (57; 54%) and police (58; 51%) regarding previous experience with disasters. The relationship between previous experience and the preparedness level will be discussed in the section on preparedness data.

Preparedness Indicators

The survey asked participants to self-identify their preparedness level on a 5-point scale from "Not at all Prepared" to "Very Prepared". Over 70% of the participants self identified as "Somewhat Prepared," a score of 4 on the 5-point scale (n=154). All responses are depicted in figure 4.4.

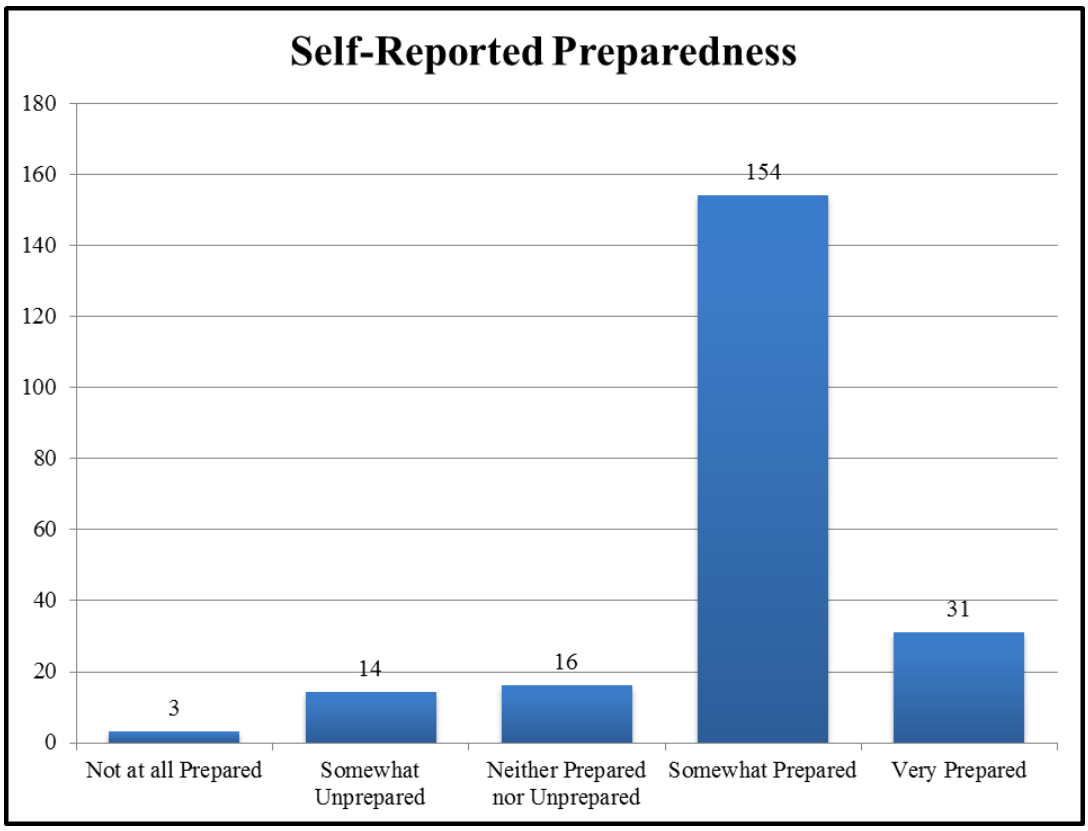

Figure 4.4 *Self-reported preparedness*

Construction of the Preparedness Index

In Chapter 3, the construct of a preparedness index was discussed. The index is calculated using responses to the following questions:

- First aid / CPR training
- Review of preparedness material
- Having an emergency plan
- Practicing an emergency plan
- Having an emergency contact plan
- Having a designated meeting place
- Items included in an emergency kit

Each of these items is discussed individually prior to discussion of the index.

All participants (n=219) indicated that they had completed first aid and/or CPR training. The time since they had that training (reported in months) was used to construct a value, *C* (see equation 3.1), for use in further analysis. Those participants who had not had first aid or CPR training in over 36 months received a score of $C = 0$. The mean number of months reported is 15.5 (resulting in a mean $C=0.61$).

A majority of the participants indicated having reviewed readiness or preparedness material (n=143; 65.3%). The most indicated sources, in order, were website (88), work (75), and printed (54). Twelve of the participants indicated "other," with eight of those being training or coursework. The sources are shown in figure 4.5.

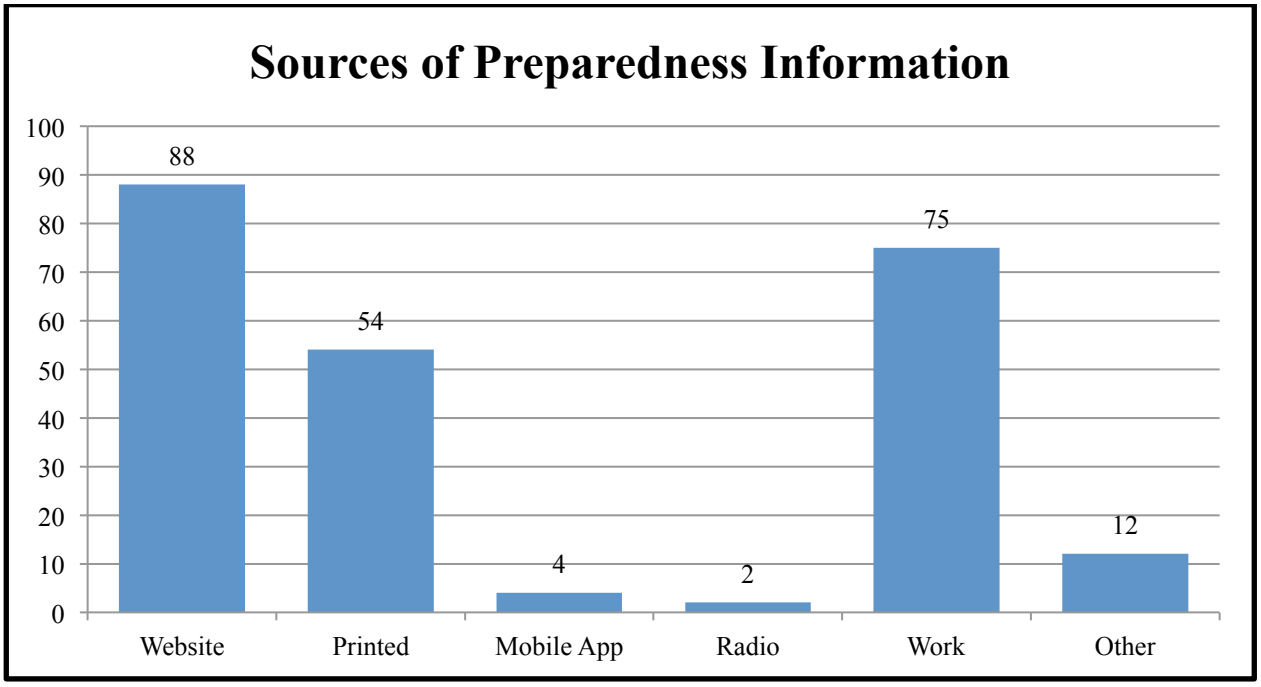

Figure 4.5 *Sources of preparedness information*

Of the 219 participants, 134 (61%) indicated that they had an emergency plan; however, only 51 (23%) indicated that they had practiced their plan. Over half of the participants indicated having an emergency contact plan (n=131; 60%), and 53% (n=115) indicated having a designated meeting place in case of an emergency.

The survey explored the participants' possession of an emergency kit in two ways. The first simply asked if the participant had an emergency kit. A majority of the participants indicated they had an emergency kit (n=136; 62%). The second portion provided a list of seventeen specific items and a place to indicate other items. Interestingly, some of the items received more responses than the number of participants who indicated they had kits (e.g. flashlights and first aid kits were each indicated by 141 participants). This is likely indicative of participants who may not have considered themselves as having a "kit" but did own some of the items typically included in an emergency kit. Table 4.3 shows the number of responses, in order from most indicated to least, of the participants. Those participants who responded in the "other" category mentioned several items. The only items receiving multiple mentions were guns and ammunition (14), amateur radio (2), and fishing equipment (2).

The number of items indicated by each participant was entered into a ratio with the total number of selections possible (18) to arrive at a "score" for the emergency kit contents. The kit scores ranged from zero (no items indicated) to one (all items indicated). The most frequent score was zero (no items indicated), with 70 participants indicating such. The frequency of scores is depicted in figure 4.6.

Table 4.3

Emergency kit items indicated by participants

Item	Participants Indicated
First aid kit	141
Flashlight	141
Cell phone charger	108
Extra working batteries	104
Multi-purpose tool, or tools to turn off utilities	104
Sanitation and personal hygiene items	92
Emergency Blanket	88

Family and emergency contact information	78
72-hour supply of food for all in household	71
72-hour supply of water for all in household	71
Battery-powered or hand crank radio	60
Extra Cash	60
Medications (7-day supply)	59
Whistle to signal for help	49
Particulate masks and plastic sheeting	46
Copies of important documents	43
Maps of area	28
Other	22

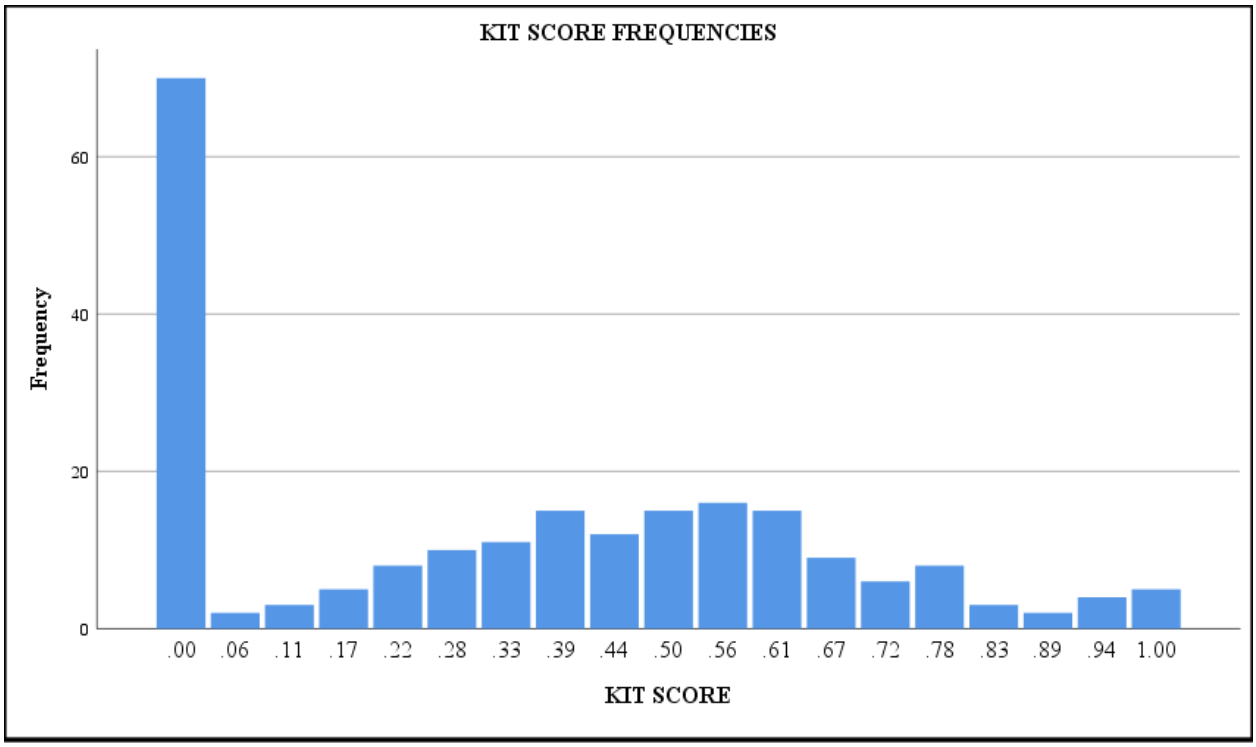

Figure 4.6 *Frequency of kit scores*

As discussed previously, all of the preparedness indicators were combined to create a preparedness index. The index is the average of the indicator values included in the response of

each individual participant. The index scores for the participants ranged from zero to one. The mean preparedness index score was 0.52 (*sd* = 0.256).

The calculation of the preparedness index allows for analysis of other variables captured in the study as they relate to the individual level of preparedness (as depicted in the calculated preparedness index scores). The following section will explore different portions of the survey data as they relate to the calculated preparedness index of the participants.

Preliminary Tests

Upon reviewing the data, it was determined that the re-coding of certain variables would be beneficial to the analysis. Additionally, missing data was addressed.

Re-coding of Data into New Variables

New variables were coded from the data to allow for more robust analyses. Within the demographic variables, the following new variables were calculated:

- Using the marriage data, a variable "Married" was constructed with a value of "1" for married and "0" for all other responses;
- Age data was recoded into a variable "Age_Yrs" where under 20 = 20; 20-29 = 25; 30-39 = 35; 40-49 = 45; 50-59 = 55; and 60 or over = 60;
- Education responses were recoded as follows: Less than high school / GED = 9; High School / GED = 12; Some college = 14; Associate Degree = 14; Bachelor Degree = 16; and Graduate Degree = 18;
- Employment status was recoded into a variable, "Fulltime," where those who work as first responders full-time were coded as "1" and all others were coded as "0";

- Time in public safety and time with agency were recoded into the variables "PS_Time" and "Agy_Time" where 0-5 = 3; 6-10 = 8; 11-15 = 13; 16-20 = 18; 21-25 = 23; and 26+ = 26; and
- The duty variable was recoded to show those participants whose job duty involved first response "1" and all others (e.g. administrators, detectives) "0."

Treatment of Missing Data

While most of the surveys contained completed questions, some were missing answers. There is a desire to ensure aggregate missing data does not cause significant impact on resulting analyses. There were 219 total participants. Of these, 201 (91.8%) completed all questions. Of the 38 items in the survey data, 27 had missing data (self-report of preparedness level, disaster experience, preparedness index, 13 impediment and facilitator items, 14 cognitive biases, sex, marital status, age, years of education, full-time duty status, time in public safety, time at agency, and duty) ranging from one to four cases. However, none of the items has a missing rate higher than 5% (11 cases). Therefore, even though the Little's (1988) MCAR (missing completely at random) test indicates a significant result ($\chi^2_{422} = 559.6, p < 0.001$), it is appropriate to assume the data are missing at random (MAR) (Howell, 2013). Accordingly, missing data were replaced by use of an expectation-maximization (EM) algorithm (Howell, 2013, as cited by Huang et al., 2017) in SPSS 25.00.

Construction of New Variables: Impediments and Facilitators

The second portion of the survey instrument included potential facilitators and impediments (motivators and barriers) to personal preparedness. These were taken from previous FEMA studies on personal preparedness (see FEMA, 2014). The section consists of

thirteen statements requiring a Likert-style response on a 5-point scale from "strongly disagree" to "strongly agree." The thirteen statements may be divided into impediments or facilitators.

Table 4.4 shows the statements, the median participant score for the statements, and the division categories for each statement.

Table 4.4
Facilitators and Impediments

	Median Score	Facilitator/ Impediment
1. Getting information about what to do in an emergency is too hard.	2	I
2. I don't know how to get prepared.	1	I
3. I don't have time to prepare.	2	I
4. Preparing is too expensive.	3	I
5. I don't need training to know how to react in an emergency.	2	I
6. My employer encourages me to have a family disaster plan.	3	F
7. My job requires me to take training to prepare for emergencies.	4	F
8. People I know have taken steps to be prepared.	4	F
9. I don't want to think about preparing for disasters.	2	I
10. I have just never thought about preparing for disasters.	2	I
11. Disasters in other places make me think about getting prepared.	4	F
12. Disasters I have experienced make me think about getting prepared.	3	F
13. It is my responsibility to care for myself and family in a disaster.	5	F

A scale reliability analysis using *Cronbach's alpha* was performed on those seven variables identified as impediments (items 1, 2, 3, 4, 5, 9, and 10) with a resulting *alpha* of .724. This shows an acceptable level of consistency (Sekaran, 2006). Accordingly, a new variable, "Impediments" was constructed from the mean of these variables.

Likewise, a scale reliability analysis was performed on those six variables identified as facilitators (items 6, 7, 8, 11, 12, and 13) with a resulting *Cronbach's alpha* of .639, which was not acceptable. An additional one-solution factor analysis (see table 4.5) indicated only items 8, 11, 12, and 13 had factor loadings greater than 0.40. The scale reliability analysis for these four items resulted in an *alpha* of .685, which was still lower than the preferred .70. Accordingly, item 8, which had relatively small factor loading, was also excluded. Another scale reliability

for items 11, 12, and 13 resulted in an *alpha* of .721. A new variable, "Facilitators," was constructed from the mean of items 11, 12, and 13.

Table 4.5
Factor Analysis results for facilitator variables

Statement	Factor
6	.196
7	.342
8	.400
11	.802
12	.740
13	.485

Extraction method: Principal Axis Factoring, 1 factor extracted, 10 iterations required

Variables based on Cognitive Bias Statements: Considerations and Expected Barriers

The survey explored the six cognitive biases identified by Meyer and Kunreuther (2017) in two different constructs. Both used a five-point Likert-style scale for responses to statements that described sentiments associated with the biases. In the first set, participants were asked to measure how much the statement influenced the participant's current state of preparedness by acting as a consideration. In the second set, the same statements were used, but participants were asked to measure how much of an expected barrier the statement posed. The statements and the median scores for each are displayed in table 4.6.

A scale reliability analysis was performed on the seven consideration responses with a resulting *Cronbach's alpha* of .484. As this was not an acceptable level of reliability, a one-solution factor analysis was performed. The resulting factor matrix is depicted in table 4.7. Statements 1, 2, 4, and 5 were subjected to a scale reliability analysis with a resulting *alpha* of .692. Although not optimal based on conventional thinking ($\alpha \geq .70$), the factor loadings were similar among the four items and the average inter-rater correlation was high ($\bar{r} = .37$).

Accordingly, it is reasonable to construct a new variable from these four items (for discussion of "acceptable" *alpha* scores, see Schmitt, 1996). The mean of the scores for these statements was used to construct a variable, "Consideration."

Table 4.6
Median scores for Cognitive Bias statements

	Median Score Consideration	Median Score Expected Barrier
1. Spending money on preparedness is difficult because I could spend the money elsewhere.	3	3
2. I will have time to prepare later; there is no rush to do it now.	2	2
3. Previous experiences with disasters have caused me to be better prepared than I otherwise would be.	3	2
4. The chance of a disaster happening to me is very remote. I do not need to prepare as much as others.	2	2
5. It is easier to keep doing what I have been doing than to change my preparedness behavior.	2	2
6. Although I could be more prepared, the steps I have taken are good enough.	2	2
7. If my friends and coworkers were more prepared, I would probably take steps to be better prepared too.	3	2

Table 4.7
Factor Analysis results for consideration variables

Statement	Factor
1	.598
2	.587
3	-.214
4	.612
5	.638
6	.107
7	.197

Extraction method: Principal Axis Factoring, 1 factor extracted, 5 iterations required

A scale reliability analysis was performed on the seven "expected barrier" responses with a resulting *Cronbach's alpha* of .780. With that level of consistency, the mean of the statements was used to construct a new variable, "Expected Barriers."

Inter-Rater Correlation

A factor analysis was performed on variables associated with previous disaster experience, impediments, facilitators, considerations, expected barriers, sex, marital status, age, years of education, full-time duty status, years in public safety, years with agency, first response duties, self-described level of preparedness, and preparedness index to create an inter-rater correlation matrix. The matrix is depicted in table 4.8. Correlations will be discussed below as they relate to the research hypotheses; however, it is noted that three variables appear to be somewhat strongly correlated. The age of the participant, the years in public safety, and the years with the agency are correlated as follows:

- Age – Years in Public Safety: $r\,(219) = .75$, $p < .001$
- Age – Years with Agency: $r\,(219) = .62$, $p < .001$
- Years in Public Safety – Years with Agency: $r\,(219) = .79$, $p < .001$

These strong correlations must be considered when completing regression analyses to examine some of the hypotheses.

Examination of Hypotheses

The preliminary tests allow for more robust and detailed examination and exploration of the proposed hypotheses of the research. Each of the proposed hypotheses is discussed below.

H1 – Self-reported preparedness levels of participants will be highly correlated to their actual preparedness level.

Exp	IMPEDIMENTS	FACILITATORS	CONSIDERATIONS	EXP_BARRIERS	Sex	MARRIED	AGE_YRS	YR_EDU	FULLTIME	PS_YRS	AGY_YRS	FIRST_RESP	Self_Prep	INDEX
000														
. -														
126 *	1.000													
031	- -													
59 **	-0.473 **	1.000												
000	0.000	- -												
.099	0.419 **	-0.361 **	1.000											
072	0.000	0.000	- -											
.032	0.337 **	-0.207 **	0.548 **	1.000										
317	0.000	0.001	0.000	- -										
.019	0.011	0.048	-0.146 *	-0.095	1.000									
392	0.437	0.241	0.015	0.081	- -									
.047	0.068	-0.029	-0.033	-0.058	0.020	1.000								
246	0.160	0.337	0.315	0.195	0.383	- -								
59 **	-0.001	-0.047	-0.089	-0.163 **	-0.001	0.273 **	1.000							
009	0.493	0.244	0.094	0.008	0.496	0.000	- -							
007	-0.012	0.006	0.019	-0.027	0.160 **	0.035	0.056	1.000						
460	0.429	0.466	0.389	0.347	0.009	0.304	0.203	- -						
.091	-0.057	0.084	-0.026	-0.024	-0.146 *	-0.064	-0.077	0.087	1.000					
089	0.199	0.107	0.351	0.361	0.016	0.173	0.129	0.100	- -					
19 **	-0.056	-0.004	-0.023	-0.122 *	0.006	0.223 **	0.750 **	0.005	-0.089	1.000				
001	0.206	0.476	0.369	0.035	0.465	0.000	0.000	0.473	0.094	- -				
36 *	-0.016	0.023	-0.009	-0.103	-0.041	0.203 **	0.621 **	0.045	0.094	0.793 **	1.000			
022	0.405	0.366	0.449	0.064	0.274	0.001	0.000	0.256	0.082	0.000	- -			
.087	0.123 *	-0.132 *	0.054	0.074	-0.134 *	-0.082	-0.294 **	-0.075	-0.024	-0.311 **	-0.216 **	1.000		
100	0.035	0.025	0.215	0.137	0.024	0.113	0.000	0.136	0.360	0.000	0.001	- -		
55 **	-0.244 **	0.175 **	-0.120 *	-0.107	-0.092	-0.063	0.047	-0.010	-0.076	0.053	0.096	-0.034	1.000	
007	0.000	0.005	0.038	0.057	0.088	0.175	0.245	0.444	0.132	0.219	0.078	0.308	- -	
50 **	-0.314 **	0.263 **	-0.257 **	-0.144 *	-0.047	0.074	0.093	0.054	-0.058	0.078	0.110	-0.004	0.411 **	1.000
000	0.000	0.000	0.000	0.017	0.245	0.139	0.084	0.215	0.196	0.125	0.053	0.476	0.000	- -

rience; IMPEDIMENTS = impediments to preparedness; FACILITATORS = Facilitators to preparedness; CONSIDERATIONS = how cognitive bias statements were considered for preparedness; EXP_BARRIERS = how
riers to preparedness; Sex = sex of participant; MARRIED = marital status of participant; AGE_YRS = age of participant in years; YR_EDU = years of formal education; FULLTIME = employment status of participant;
nt; AGY_YRS = years participant has been at current agency; FIRST_RESP = participant status as a first responder as regular duty; Self_Prep = participant self evaluation of preparedness; INDEX = constructed value of

)

d).

This hypothesis is testing the correlation of two constructs used to measure what should be the same item – preparedness of the participant. The first variable is the self-reported level of preparedness, and the second variable is the constructed preparedness index. As they should measure the same thing, it is hypothesized that that the two measurements would be highly correlated. A Pearson product-moment correlation coefficient was computed to assess the relationship between the self-reported preparedness level and the constructed preparedness index. There was a moderate correlation between the two variables ($r(219) = .411$, $p<.001$). As this result does not show a compelling ($\geq .50$) correlation (Cohen, 1992), the null hypothesis is accepted, and H1 is rejected. This finding, however, is interesting and will be discussed further in Chapter 5.

This result also gives rise to an additional research question. Do predictors of preparedness have consistent effect sizes when viewed through the self-reported preparedness levels and the calculated preparedness index levels? Stated differently, what causes gaps between perceived preparedness and actual preparedness? This will be discussed with the analysis associated with Hypothesis 4, below.

H2 – Participants will differentiate between actual considerations and expected barriers, as indicated by significant differences in the means of the cognition attributes.

The seven cognitive bias statements used to examine the considerations participants may have had in their preparedness and that participants may identify as expected barriers to their preparedness were examined to see if significant differences existed in how the statements were viewed (consideration as opposed to expected barrier) and also variance amongst the statements themselves. The construct of the variables "considerations" and "expected barriers" is discussed above in the preliminary tests section; however, it is important to re-state that the consideration

variable is constructed by using only four of the statements, while the expected barrier variable utilizes all statements in its construction. For the MANOVA testing below, the original statement data was used rather than the constructed variables.

A MANOVA analysis was performed on the responses to the cognitive bias statements to examine the differences between the status (consideration or expected barrier), and a statistically significant difference was found, $F(1,218) = 5.38$, $p < .05$, Wilk's $\Lambda = .976$. This would lead to a conclusion that the cognitive bias statements viewed as considerations for the current level of participant preparedness and the same statements when viewed as expected barriers to preparedness are independent concepts.

When examining the MANOVA analysis as it related to the separate cognitive statements, it showed statistically significance, $F(6,211) = 21.93$, $p < .001$, Wilk's $\Lambda = .618$. This would lead to a finding that the concepts are built by some, but not all, of the statements. This was also seen in the testing to construct the consideration and expected barrier variables, as discussed in the preliminary tests above.

H3 – Some demographic and experience characteristics will be significantly correlated to and predictive of impediments, facilitators, considerations, and expected barriers.

The examination of the correlation of demographics and disaster experience to impediments to preparedness, facilitators of preparedness, cognitive biases as consideration to preparedness, and cognitive biases as expected barriers to preparedness is a main goal of the present research. Each of the dependent variables will be reviewed separately.

Correlates to Impediments to Preparedness

Within the data gathered from the study population, the only statistically significant correlation between the captured demographic data and impediments to preparedness was the

participant classification as a first responder (variable FIRST_RESP; first responders = 1, all others = 0). The first responder variable was weakly correlated to impediments to preparedness (r (219) = .123, p < .05). There was also a statistically significant weak negative correlation between previous disaster experience and impediments to preparedness (r (219), = -.126, p < .05).

A simple linear regression was calculated to predict impediments to preparedness based on the demographic variables (without age or years at agency due to their high correlation with years in public safety, and years in public safety having a higher correlation to impediments) and previous disaster experience. The results are shown in table 4.9.

Correlates to Facilitators to Preparedness

The only statistically significant correlation between the captured demographic data and facilitators to preparedness was the participant classification as a first responder (variable FIRST_RESP; first responders = 1, all others = 0). The first responder variable was weakly negatively correlated to facilitators to preparedness (r (219) = -.132, p < .05). There was also a statistically significant weak correlation between previous disaster experience and facilitators to preparedness (r (219), = .259, p < .001).

A simple linear regression was calculated to predict facilitators to preparedness based on the demographic variables (without age) and previous disaster experience. Previous disaster experience appeared as a statistically significant predictor (β = .444, p < .001). The results of the regression analysis are found in table 4.9.

Correlates to Cognitive Bias Considerations

Only one of the demographic variables showed any statistically significant correlation to the consideration of cognitive biases in present preparedness levels. The sex of the participant

Facilitators			Considerations			Expected Barriers			Reported Preparedness Level			Actual Preparedness Level		
B	Standard error (*B*)	*β*	*B*	Standard error (*B*)	*β*	*B*	Standard error (*B*)	*β*	*B*	Standard error (*B*)	*β*	*B*	Standard error (*B*)	*β*
.165	.194	.058	-.431*	.187	-.162	-.254	.183	-.098	-.298	.192	-.107	-.070	.061	-.075
-.001	.116	.000	-.068	.112	-.042	-.053	.110	-.034	-.104	.114	-.062	.049	.036	.087
-.014	.036	-.026	.027	.034	.054	-.001	.034	-.003	.004	.035	.007	.012	.011	.067
.096	1.375	.170	-.527	.555	-.068	-.371	.544	-.049	-1.113*	.564	-.139	-.272	.179	-.101
-.160	-1.368	.173	.000	.012	.002	-.010	.011	-.102	-.017	.012	-.167	-.005	.004	-.135
.009	.013	.078	.002	.013	.019	-.001	.013	-.008	.026*	.013	.223	.007	.004	.183
-.442	.233	-.133	.077	.224	.025	.067	.220	.022	-.054	.229	-.017	.058	.073	.054
.444**	.107	.281	-.162	.103	-.110	-.021	.101	-.015	.172	.108	.113	.103**	.034	.201
--	--	--	--	--	--	--	--	--	-.232*	.094	-.196	-.087**	.030	-.221
--	--	--	--	--	--	--	--	--	.047	.077	.048	.025	.024	.075
--	--	--	--	--	--	--	--	--	-.014	.089	-.013	-.053	.028	-.151
--	--	--	--	--	--	--	--	--	-.036	.086	-.033	.011	.027	.031
3.726**	.811	--	2.480**	.780	--	2.808**	.765	--	5.363**	.914	--	.644*	.291	--
3.09 / .003 **			1.09 / .371			.755 / .643			2.29 / .010 **			4.41 / .000 **		
8			8			8			12			12		
.069			.003			-.009			.066			.158		

of participant; AGE_YRS = age of participant in years; YR_EDU = years of formal education; FULLTIME = employment status of participant; PS_YRS = years of public safety
en at current agency; FIRST_RESP = participant status as a first responder as regular duty; Dis_Exp = Participant's previous disaster experience; IMPEDIMENTS = impediments
edness; CONSIDERATIONS = how cognitive bias statements were considered for preparedness; EXP_BARRIERS = how cognitive bias statements were seen as expected

(male = 0; female = 1) was very weakly negatively correlated to consideration (r (219) = -.146, p < .05). Previous disaster experience showed no statistically significant correlation to considerations of cognitive biases.

A simple linear regression was calculated to predict cognitive bias considerations to current preparedness based on the demographic variables (without age) and previous disaster experience. The results were non-significant; however, sex showed significance as a coefficient (β = -.431, p < .05). The results of the regression analysis are shown in table 4.9.

Correlates to Cognitive Biases as Expected Barriers

Two of the demographic variables showed statistically significant correlation to cognitive biases being expected barriers to preparedness. The age (in years) of the participant was very weakly negatively correlated to consideration (r (219) = -.163, p < .01). Years in public safety was also very weakly negatively correlated (r (219) = -.122, p < .05). As was discussed earlier, these two variables are closely correlated, so this is not viewed as overly meaningful. Previous disaster experience showed no statistically significant correlation to considerations of cognitive biases.

A simple linear regression was calculated to predict cognitive biases as expected barriers to current preparedness based on the demographic variables (without age) and previous disaster experience. The results, as shown in table 4.9, were non-significant.

Test Conclusions

While there were some variables found to be statistically significant correlates with the dependent constructs of facilitators, considerations, and expected barriers, the correlations were weak to very weak. Linear regression analyses showed very few significant coefficients. The meaning of the results is discussed further in Chapter 5.

H4 – Demographic and experience characteristics, impediments, facilitators, actual considerations, and expected barriers will be significantly correlated and predictive of reported and actual preparedness levels.

Analyzing how all of the variables may or may not impact preparedness levels (actual or self-perceived) is of special interest in the present research. This hypothesis is concerned with how the eight demographic variables (sex, marital status, age, years of education, full-time status, time in public safety, time with the agency, and status as a first responder), previous disaster experience, impediments to preparedness, facilitators to preparedness, considerations, and expected barriers (all discussed previously) correlate to participant self-reported preparedness levels and calculated preparedness index scores. Each of these two measures of preparedness is discussed in turn.

Correlates to Self-Reported Preparedness

Three variables showed statistically significant correlation to the participant self-reported level of preparedness. Previous experience with disasters showed a very weak positive correlation ((r (219) = .17, p < .01). Facilitators also showed a very weak positive correlation (r (219) = .18, p < .01). Finally, impediments showed a weak negative correlation (r (219) = -.24, p < .001). These are shown in table 4.8.

A simple linear regression was calculated to predict self-reported preparedness levels based on the demographic variables (age was removed), previous disaster experience, impediments, facilitators, considerations, and expected barriers. Three coefficients proved statistically significant: Full-time status (β = -.10, p<.05), years at agency (β = .18, p<.05), and impediments (β = -.09, p<.05). The full results are shown in table 4.9.

Correlates to Preparedness Index Scores

The analysis found several variables to be statistically significant in their correlation with the preparedness index score: previous disaster experience, impediments, facilitators, considerations, and expected barriers were all weakly correlated. As expected, the impediments variable is negatively correlated. Likewise, the variables associated with cognitive biases (considerations and expected barriers) are negatively correlated. These correlations are shown in table 4.8.

A simple linear regression was calculated to predict preparedness index scores based on the demographic variables (without age), previous disaster experience, impediments, facilitators, considerations, and expected barriers. Two coefficients proved statistically significant: previous disaster experience ($\beta = .20$, $p<.01$) and impediments ($\beta = -.22$, $p<.01$). The full results are shown in table 4.9.

Test Conclusions

More variables in the study were found to be significantly correlated to the constructed preparedness index measurement than to the self-reported level of preparedness. As the two measurements were shown in the analysis of *Hypothesis 1* to not have a strong correlation, this is not unexpected. Linear regression models found few significant predictors.

The difference in predictors for self-reported preparedness and actual preparedness as measured through the constructed preparedness index is of interest to the additional research question proposed in the analysis of *Hypothesis 1*. The question is re-stated here: Do predictors of preparedness have consistent effect sizes when viewed through the self-reported preparedness levels and the calculated preparedness index levels? Stated differently, what causes gaps between perceived preparedness and actual preparedness?

Reviewing the models in table 4.9, the constructed impediments variable is shown to be negatively correlated with both self-reported preparedness levels and the calculated preparedness index. As it is seen in both constructs, it is concluded that those items identified as impediments are truly impediments to preparedness efforts.

It is interesting to find disaster experience as significant to both self-reported preparedness and actual preparedness in the inter-rater (participant) correlation; however, disaster experience is only significant as a predictor in the regression analyses for actual preparedness. Additionally, full-time status and years with the agency arose as statistically significant predictors in the self-report model but not the actual preparedness model.

Results for Original Research Questions

The first item that should be discussed is the level of preparedness of the first-responder participants in the study. As was discussed previously, the mean score for the calculated preparedness index was 0.52 (*sd* = .256). At face value, the mean score is concerning, as first responders, for all of the reasons discussed herein, need to be prepared for the wellbeing of the entire community. Contrary to expectations, the preparedness index scores were fairly normally distributed (skewness = -.085, *ns.*) in which over three-quarters (76.7%) of the participants had preparedness index scores of 0.75 or less.

Of the listed specific impediments, the median scoring was relatively low. Expense as an impediment received the highest median score of the impediment statements. This perception by the participants should be explored further to expand on the idea or construct of cost of preparedness. This can be viewed within the framework of the Myopia Bias discussed by Myer and Kunreuther (2017).

The review of the potential impact of cognitive biases was of interest. As is shown in table 4.6, the highest median scores for participant consideration of cognitive bias statements in their current state of preparedness were statements involving Myopia Bias, Amnesia Bias, and Herding Bias. When asked to rate the statements as they were seen as expected barriers to preparedness, only the statement concerning spending of money (Myopia Bias) had a higher median score. With the statement, "Spending money on preparedness is difficult because I could spend the money elsewhere," having a higher median score as a current consideration and as an expected barrier, it would bolster the idea of an effect of the Myopia Bias as discussed by Meyer and Kunreuther (2017). This complements the impediment finding discussed above.

The analysis and testing completed as part of this study showed several expected correlations; however, the correlations were, in general, very weak. While the strength of the correlation may not have been strong, the differences in correlation among some of the studied variables proved of interest. This is discussed further in Chapter 5.

Chapter 5

Discussion

The present study researches various aspects of the personal preparedness of first responders in a large, diverse, heavily-populated, metropolitan county in Georgia. A key focus of the research is to gauge the personal preparedness of the first responders and to explore impediments to preparedness to include the concept of cognitive biases. Prior to looking at impediments, the level of preparedness has to be measured in some manner.

Preparedness Amongst First Responders

When asked to rate their personal level of preparedness, the participants mostly answered that they were "somewhat prepared" (four on a five-point Likert-style scale). As the concept of preparedness is continuous, not divided into neatly discrete and separate categories, the mean of the answers is considered. The mean score for self-reported preparedness is 3.9 out of a possible 5.0 (*sd = 0.766*). In an over-simplified model, this equates to 78%. The preparedness index scores, however, tell a different story. The mean score for preparedness index is .516 (51.6%; *sd* = 0.256).

As was discussed previously, the correlation between self-reported preparedness level and preparedness index score was fairly weak (r (219) = .411, $p < .001$). This would lead to a belief that there was some disconnect between how the participants believe they are prepared as opposed to how they are actually prepared. The difference may reside in diverse perceptions of how participants view "preparedness" or define the concept for their personal situation. It is also interesting to note that the self-reported levels are higher than the scored levels. This could tend to favor a finding of optimism bias or simplification bias as discussed by Meyer and Kunreuther (2017).

Impediments

Factor analysis showed a significant level of similarity among statements identified as potential impediments to preparedness. When the statements were viewed individually, the statement concerning the expense of becoming prepared had the highest Likert-style score of all of the statements. This particular impediment may be indicative of cognitive bias impact. This is discussed more below. Additionally, potential methods in which to mitigate this identified impediment will be discussed in the organizational recommendations section below.

Cognitive Biases

To begin the discussion on cognitive biases, the biases as discussed by Meyer and Kunreuther (2017) are restated here. The six biases identified by Meyer and Kunreuther are:

1. *Myopia: a tendency to focus on overly short future time horizons when appraising immediate costs and the potential benefits of protective investments;*
2. *Amnesia: a tendency to forget too quickly the lessons of past disasters;*
3. *Optimism: a tendency to underestimate the likelihood that losses will occur from future hazards;*
4. *Inertia: a tendency to maintain the status quo or adopt a default option when there is uncertainty about the potential benefits of investing in alternative protective measures;*
5. *Simplification: a tendency to selectively attend to only a subset of the relevant factors to consider when making choices involving risk; and*
6. *Herding: a tendency to base choices on the observed actions of others.* (p. 12)

Indicia of the myopia bias were observed in the portion of the study concerning impediments, where the expense of preparing was the greatest overall reported impediment in

this population. Additionally, in the portions of the study specifically concerning cognitive biases, the statements aligned with myopia bias had the highest rankings as considerations for current levels of preparedness and as expected barriers to preparedness.

The difference seen in how the participants rank their level of preparedness and how the survey items calculate a level of actual preparedness is telling. The differences have been discussed thoroughly above. That there is such a remarkable difference in the self-assessment and actual measurement is indicative of optimism bias or simplification bias. This is indicative of optimism bias, as it shows an overly optimistic view of preparedness which could tend to bias the participant against any further or expanded preparedness efforts. This idea also overlaps with the Meyer and Kunreuther's concept of simplification bias, whereby participants may believe what steps have been taken are enough to believe themselves prepared, regardless of their actual level of preparedness.

Differences between self-reported levels of preparedness amongst the participants and their actual (as measured) levels of preparedness have been discussed above. Previous disaster experience shows a correlation to actual preparedness but not self-reported levels. This certainly could be due to the effect of something akin to the phenomenon of amnesia bias discussed by Meyer and Kunreuther (2017). However, it is interesting that the bias would manifest in the conscious, self-reported, measure as opposed to the actual measure. Apparently the perception of the participant plays a role in this impact.

Implications

Although the present study has limitations as discussed below, it provides an insight into the state of preparedness of first responders – an area that has not received much prior research. As first responders are but a subset of the general population, the demographic information could

be used to either help further confirm or refute existing studies. However, as was discussed in the review of the literature, the conclusions of the previous studies of demographics as predictors of preparedness have been mixed. Accordingly, this study of limited population will agree with some studies and refute the findings of others.

This study gave several glimpses of cognitive biases or potential cognitive biases as discussed by Meyer and Kunreuther (2017). The findings therefore are encouraging for future work on the impact of cognitive biases on preparedness, as this study would tend to validate the existence and acknowledgement of cognitive biases within the study population. Accordingly, the study yields itself to several organizational recommentations.

Organizational Recommendations

The research is limited in its generalizability, as is discussed in the limitations below; however, the findings can be informative to leaders of public safety organizations and policy makers for local governments. First response organizations such as law enforcement agencies, fire departments, and emergency medical providers should have a vested interest in the ability of their employees to be prepared in a manner that will allow them to function effectively in a time of emergency or disaster. For planning purposes, it can be assumed that a better prepared employee would be less likely to be impacted in a disaster to a point that they would not be able to respond for duty (Kelenske, 2011). The leaders of first response organizations should educate themselves on what barriers to the preparedness of their employees exist and how best to mitigate those barriers.

The cost of preparedness is a barrier that emerged in self-reporting of impediments and in the cognitive bias statements. Using this as an example, organizational leaders and policy makers should look for ways to mitigate this barrier. This could be done through issuance of

certain equipment to employees (e.g., non-perishable emergency kit items). Perhaps grant funding could assist in such an endeavor. The leaders and policy makers, however, should think in terms of overcoming or mitigating barriers in order to have better prepared employees. Such action could benefit the organization and the community served.

In a larger sense, first response organizations should be cognizant of the preparedness levels of their employees. This should be a basic element of the organization's overall planning and preparedness efforts. By gauging the preparedness levels of their employees, the organizational leaders could plan for best methods to increase preparedness among their employees. By utilizing methods such as used in this research, an organization could learn what barriers may exist to a better prepared workforce and mitigate such barriers. The organization must also be aware of the effect of cognitive biases as impediments to preparedness and look for ways to mitigate the impact of such biases.

Limitations of the Study

The present study is not without limitations on its generalizability and applicability outside of the limited geographical area in which the study was conducted. While the entire population of first response professionals for cities within Gwinnett County, Georgia, was included, the results are only attributable to that particular population. It could give a starting point to make assumptions about other first response populations; however, the findings here could not be applied to first responders in other areas of Georgia, much less anywhere else.

Having a comparator group of the general population in a similar study would allow for an examination of differences that would emerge simply due to the profession and the concomitant training and experience that comes with such profession. This is discussed further in the suggestions for future research below.

Suggestions for Further Research

Replications of the present study in other areas, with other populations, or with a sample from a larger population of first response professionals could add to the knowledge base on first responder preparedness, what impediments detract from their preparedness, what facilitators aid in their preparedness, and what role cognitive biases play in preparedness levels. While the Federal Emergency Management Agency [FEMA] does have a program targeting first responders (e.g., the Ready Responder program – www.ready.gov/responder), having specific information on impediments, facilitators, and cognitive biases as they impact the preparedness levels of first responders could inform national agencies such as FEMA or the American Red Cross on how better to encourage higher levels of preparedness among first response personnel. Such information could also be beneficial to state and local policy makers interested in mitigating barriers to preparedness among their first response personnel that are counted upon to be present when disaster strikes.

A study in an area that would compare and contrast first response personnel and members of the general population to better understand the differences that identified impediments, facilitators, and cognitive biases have on the general population and this specific subset of that population would be beneficial. In the present study, the demographic variables apparently had non-significant effects on the cognitive bias variables. This is interesting; however, a study including first responders and non-first-responders would be necessary to see if a difference existed between the two populations. Specifically, does the training and experience of first response personnel have an effect on the impact of cognitive biases on preparedness?

The expense of preparedness emerged as the highest-scoring impediment (by mean scores, see table 4.4) by the study participants. The construct of expense should be further

evaluated to better understand perceptions of expense as opposed to the realities. An expense-related cognitive bias statement had a higher median score than other cognitive bias statements. These findings would encourage further research into the impact of Myopia Bias as discussed by Meyer and Kunreuther (2017).

Conclusion

The present study was informative along several lines of inquiry. Unfortunately, one of the key findings was that first responders in the particular geographic area of research are not well prepared personally for disasters. This finding is not critical of any of the agencies or participants involved. Furthermore, it says nothing about the abilities of the agencies. The finding does not indicate the individual first responders cannot or will not respond effectively in a disaster; however, it does give cause for concern about the individual capacity to withstand a disaster impact. This, in turn, could cause a loss in effective capability to respond.

Once a deficiency in preparedness is determined or identified, the next logical step is to learn why there is a lack of preparedness. This study looked at impediments to preparedness that were manifested as cognitive biases or other barriers. As was stated in the introduction, barriers and biases that are impediments to preparedness must be identified before they may be mitigated or defeated. A goal of this research was to assist in identifying specific barriers and biases to allow for strategic efforts to combat the impediments with a goal to increase preparedness among first responders.

While the study was limited in generalizability to the population studied, it is hoped that the study can serve as a catalyst to inform and educate policy makers and leaders of first-response agencies to evaluate preparedness levels, identify any impediments to preparedness,

and plan for mitigation of such impediments in order to create a culture of preparedness that will benefit the individual, the agency, and the community served.

Resources

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Appendix A

Cover Letter

Informed Consent

Survey Instrument

PRINTED ON POLICE DEPARTMENT LETTERHEAD

December 14, 2017

Dear Sir or Madam:

My name is Jeff Smith, and I am a 29-year police veteran and fifth-generation police officer. I am also a doctoral student at Jacksonville State University in Jacksonville, Alabama, where I am studying Emergency Management. In my studies, I am focusing on first response personnel and their personal disaster preparedness. My goal is to use the research to inform public policy in order to assist first responders become better prepared on a personal level.

By surveying current public safety first response professionals, I can gain a better understanding of current individual preparedness levels and the barriers to such preparedness. It is important for the study for your voice and your perceptions to be captured.

The survey consists of 50 questions and should take 10-15 minutes to complete. The survey will ask about your personal preparedness and will also ask questions about the barriers to being better prepared.

Your answers will be kept completely anonymous and the actual survey instruments will only be shared with those persons directly involved in the research. There is no space on the survey for your name, and you should not write your name on the survey.

If you have any questions or concerns, please feel free to contact me directly by phone at (770) 670-5005 or by email at jsmith@lawrencevillepd.com or jsmith54@stu.jsu.edu. The study is being overseen by faculty of the Emergency Management Department at Jacksonville State University. If you should have questions or concerns that you are not comfortable addressing with me, please feel free to contact Dr. Jane Kushma at jkushma@jsu.edu.

I value your experience and insight, and I thank you in advance for participating in this study and providing your knowledge and perceptions to the study. I look forward to receiving your answers and using your responses to help inform public policy in the future.

Best regards,

Capt. Jeff Smith

Thank you for agreeing to complete this survey that will not only capture information about preparedness and barriers to preparedness, but will also assist me with the completion of the final portion of my degree.

The purpose of this research is to learn about preparedness levels of first responders, and what barriers prevent first responders from being better prepared.

PROCEDURES: You have been selected because of your role in local government and first response to emergencies and disasters. If you agree to participate in this research you will be asked to complete this survey. Only the researcher and his faculty advisor will have access to the actual surveys.

DURATION: The time commitment to participate in this study will consist of 15-20 minutes, the time needed to complete the survey.

CONFIDENTIALITY: This survey will not collect your name; the data collected will be used as a body of data – individual surveys will be kept confidential by the researcher to the greatest extent possible.

RISKS: There are not any foreseeable risks or discomforts to you as a participant in this research.

BENEFITS: There is no promise of an individual benefit to the participants; however, the culmination of the research may help to inform the practices associated with the profession of the participants and provide knowledge to those in the profession. Participants may opt to receive the final research, when completed.

WITHDRAWAL: Your participation in this research is completely voluntary, and refusal to participate will result in no penalty. If you choose to participate you may refuse to answer any question on the survey at your discretion. You may withdraw from the study at any time by informing the researcher of your wish to do so either verbally or in writing.

CONCERNS: If you have any concerns or questions concerning this research, you may contact Jeff Smith at 770-670-5005 or jsmith@lawrencevillepd.com. For information regarding your rights as a research participant, please contact Dr. Jane Kushma at (256) 782-5925 or jkushma@jsu.edu.

CONSENT: By choosing YES below, you are stating you have read and understand the information on this page and are willing to participate in the survey.

☐ Yes ☐ No

Part I: Personal Preparedness

For purposes of this survey, preparedness indicates a level of readiness to respond appropriately to the onset of a disaster and be self-sufficient for a period of no less than 72 hours.

In general, how do you rate your individual personal preparedness for emergency situations such as natural disasters and terrorist events?

☐	☐	☐	☐	☐
Very Prepared	Somewhat Prepared	Neither Prepared nor Unprepared	Somewhat Unprepared	Not at all Prepared

Have you personally experienced a disaster such a tornado, hurricane, earthquake, or terrorist attack?

☐ Yes ☐ No

Have you completed first aid or CPR training? ☐ Yes ☐ No

If yes, how many months ago? _____

Have you reviewed any readiness or preparedness material such as that published by the American Red Cross, the Federal Emergency Management Agency, or the Georgia Emergency Management Agency?

☐ Yes ☐ No

If so, how was the information received? (Please check all that apply)

☐ Website ☐ Printed ☐ Mobile App ☐ Radio

☐ Work ☐ Other (please specify):_____

	Yes	**No**
Do you have an emergency plan?	☐	☐
If yes, have you practiced it?	☐	☐
Do you have an emergency contact plan?	☐	☐
Do you have a designated meeting place in case of emergency?	☐	☐
Do you have an emergency kit?	☐	☐

If you have an emergency kit, please indicate which of the following are included in the kit:

☐ Battery-powered or hand-crank radio	☐ Flashlight(s)
☐ Extra working batteries	☐ First aid kit
☐ Medications (7-day supply)	☐ Whistle to signal for help
☐ Sanitation and personal hygiene items	☐ Copies of important documents
☐ Cell phone charger(s)	☐ Map(s) of area
☐ Extra cash	☐ Emergency blanket

☐ Multi-Purpose Tool or tools to turn off utilities
☐ Family and emergency contact information
☐ Particulate masks, and plastic sheeting and duct tape for sheltering in place
☐ 72-hour supply of water for all members of the household
☐ 72-hour supply of food for all members of the household & manual can opener

☐ Other (please specify):_____

Part II: Motivators and Barriers to Preparedness

Please rate each of the following statements using a scale of 1 – 5 (circle your response)
(1 – strongly disagree; 2 – somewhat disagree; 3- neither agree nor disagree; 4 – somewhat agree; 5 – strongly agree)

Getting information about what to do in an emergency is too hard	1	2	3	4	5
I don't know how to get prepared	1	2	3	4	5
I don't have time to prepare	1	2	3	4	5
Preparing is too expensive	1	2	3	4	5
I don't need training to know how to react in an emergency	1	2	3	4	5
My employer encourages me to have a family disaster plan	1	2	3	4	5
My job requires me to take training to prepare for emergencies	1	2	3	4	5
People I know have taken steps to be prepared	1	2	3	4	5
I don't want to think about preparing for disasters	1	2	3	4	5
I have just never thought about preparing for disasters	1	2	3	4	5
Disasters in other places make me think about getting prepared	1	2	3	4	5
Disasters I have experienced make me think about getting prepared	1	2	3	4	5
It is my responsibility to care for myself and family in a disaster	1	2	3	4	5

Part III – Attitudes Toward Preparedness

*Now I would like to learn about what has influenced your current state of preparedness. Please read each of the following seven statements relating to attitudes toward personal preparedness. Please indicate to what extent **you** would consider each of the following statements in **YOUR** preparedness.*

Spending money on preparedness is difficult because I could use the money elsewhere.

☐ Not at All ☐ Slightly ☐ Moderately ☐ Significantly ☐ Extremely

I will have time to prepare later; there is no need to rush to do it now.

☐ Not at All ☐ Slightly ☐ Moderately ☐ Significantly ☐ Extremely

Previous experiences with disasters have caused me to be better prepared than I otherwise would be.

☐ Not at All ☐ Slightly ☐ Moderately ☐ Significantly ☐ Extremely

The chance of a disaster impacting me is very remote. I do not need to prepare as much as others.

☐ Not at All ☐ Slightly ☐ Moderately ☐ Significantly ☐ Extremely

It is easier to keep doing what I have been doing than to change my preparedness behavior.

☐ Not at All ☐ Slightly ☐ Moderately ☐ Significantly ☐ Extremely

Although I could be more prepared, the steps I have taken are good enough.

☐ Not at All ☐ Slightly ☐ Moderately ☐ Significantly ☐ Extremely

If my friends and coworkers were more prepared, I would probably take steps to be better prepared too.

☐ Not at All ☐ Slightly ☐ Moderately ☐ Significantly ☐ Extremely

Now I would like to know if you feel the following attitudes created an impediment or barrier to your being more prepared. For each statement below, please indicate your level of belief that the statement would be a barrier to preparedness.

Spending money on preparedness is difficult because I could use the money elsewhere.

☐	☐	☐	☐	☐
Not at All a Barrier	A Slight Barrier	A Moderate Barrier	A Significant Barrier	An Extreme Barrier

I will have time to prepare later; there is no need to rush to do it now.

☐	☐	☐	☐	☐
Not at All a Barrier	A Slight Barrier	A Moderate Barrier	A Significant Barrier	An Extreme Barrier

Previous experiences with disasters have caused me to be better prepared than I otherwise would be.

☐	☐	☐	☐	☐
Not at All a Barrier	A Slight Barrier	A Moderate Barrier	A Significant Barrier	An Extreme Barrier

The chance of a disaster impacting me is very remote. I do not need to prepare as much as others.

☐	☐	☐	☐	☐
Not at All a Barrier	A Slight Barrier	A Moderate Barrier	A Significant Barrier	An Extreme Barrier

It is easier to keep doing what I have been doing than to change my preparedness behavior.

☐	☐	☐	☐	☐
Not at All a Barrier	A Slight Barrier	A Moderate Barrier	A Significant Barrier	An Extreme Barrier

Although I could be more prepared, the steps I have taken are good enough.

☐	☐	☐	☐	☐
Not at All a Barrier	A Slight Barrier	A Moderate Barrier	A Significant Barrier	An Extreme Barrier

If my friends and coworkers were more prepared, I would probably take steps to be better prepared too.

☐	☐	☐	☐	☐
Not at All a Barrier	A Slight Barrier	A Moderate Barrier	A Significant Barrier	An Extreme Barrier

Part IV: Demographics

Sex: ☐ Male ☐ Female

Marital Status: ☐ Single, never married ☐ Married ☐ Divorced ☐ Widowed ☐ Other

Age group: ☐ Under age 20 ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60 or over

Education: ☐ Less than High School / GED
☐ High School / GED ☐ Some College
☐ Associate Degree ☐ Bachelor's Degree ☐ Graduate Degree

Employment status: ☐ Full-time ☐ Part-time ☐ Volunteer / Reserve ☐ Other

Years in public safety (total): ☐ 0-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ 21-25 ☐ 26+

Years at current agency: ☐ 0-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ 21-25 ☐ 26+

Current Agency:_____

Which of the following best describes your current duty assignment?

Fire / EMS:

☐ Fire/EMS Operations ☐ Support ☐ Administration

☐ Other (please describe):_____

Law Enforcement:

☐ Uniform Patrol ☐ Traffic Enforcement ☐ Criminal Investigations
☐ Special Investigations (e.g. narcotics, vice) ☐ Administration

☐ Other (please describe):_____

What best describes your current rank:

Fire / EMS:

☐ Firefighter I ☐ Firefighter II ☐ Firefighter III ☐ Driver / Engineer
☐ Lieutenant ☐ Captain ☐ Battalion or Other Chief

☐ Other (please describe): _____

Law Enforcement:

☐ Police Officer ☐ Corporal ☐ Detective
☐ Sergeant ☐ Lieutenant ☐ Captain, Major, Colonel, or Chief

☐ Other (please describe): _____

Is there anything else you would like me to know about your preparedness, or recommendations you might make about enhancing preparedness/taking action?

Thank you for your time in taking this survey.